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COLUMBIA UNIVERSITY
BULLETIN OF INFORMATION

Fifty-first Series, No. 42 November 3, 1951

Report of the Dean of the Faculty of Medicine

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1951

COLUMBIA-PRESBYTERIAN MEDICAL CENTER
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Fifty-first Series, No. 42 November 3, 1951

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The series includes the Report of the President to the Trustees and the Announcements of the several Colleges and Schools relating to the work of the next year. These are made as accurate as possible, but the right is reserved to make changes in detail as circumstances require. The current number of any of these Announcements will be sent upon application to the Office of University Admissions.

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FACULTY OF MEDICINE

REPORT OF THE DEAN

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1951

To the President of the University

SIR:

I have the honor to submit the annual report of the activities under the Faculty of Medicine for the academic year 1950–1951.

The registration of the School of Medicine was as follows:

First year	120
Second year	120
Third year	106
Fourth year	111
TOTAL	457

We have reason to be gratified by the record which our graduating class made in securing internship appointments. Three students took special research assignments and four elected service with hospitals of the United States Army, the Air Force, and the United States Public Health Service. The 104 remaining students filed 576 applications for intern appointment with 127 hospital services throughout the nation. They received 317 offers of appointment, an average of more than three offers per student. Seventy-nine students accepted appointment on the service which was their first choice. Almost all appointments were in teaching hospitals.

Residents from 47 states, totaling 2,308 students from 290 colleges, applied for admission to the first-year class entering in September, 1951. The 120 students accepted received their liberal arts education in 45 different colleges and came from 21 states. With one or two exceptions, all have completed four years of academic work in a liberal arts college. The average age of the civilian students accepted is about twenty years, whereas that of the veterans is about twenty-five years. Twenty-one of the 102 male students accepted are veterans. The wide distribution of

applicants for admission and the acceptances are illustrated in the following figures:

Area	*Applicants*	*Acceptances*
New York City	806	37
New York State (exclusive of New York City)	256	18
Other states or territories	1,229	62
Foreign	17	3
TOTAL	2,308	120

The Dental School's registration was as follows:

First year	40
Second year	37
Third year	25
Fourth year	26
TOTAL	128

There were 121 students registered for noncredit postgraduate courses in the Dental School and 32 students registered for postgraduate credit courses during the year. A class of 18 students was enrolled in Dental Hygiene and 11 received the Bachelor of Science degree.

In the School of Public Health the registration was as follows:

D.P.H. candidates	1
M.P.H. candidates	27
M.S. candidates	77
TOTAL	105

The registration in the School of Nursing was as follows:

First year	113
Second year	93
Third year	100
TOTAL	306

In the Course for Occupational Therapists 86 students were regis-

tered; 52 students were registered in the Course for Physical Therapists. The following degrees were awarded during the year:

M.D.	109
Med.Sc.D.	5
D.D.S.	23
M.P.H.	26
M.S. (Public Health fields)	47
B.S. (Nursing, Occupational Therapy, Physical Therapy, Dental Hygiene)	77

In addition to the students enrolled under the Faculty of Medicine there were 69 students registered under the Graduate Faculties of the University who took courses and advanced research work in the departments of the Medical School.

During the year, 908 physicians took 114 postgraduate courses. The cut-off date for the benefits under the Servicemen's Readjustment Act of 1944 is scheduled for July 25, 1951. Therefore, it is probable that there will be a reduction in the actual enrollment in the courses, particularly of veterans, during the next year.

One hundred and five visiting scholars from 33 foreign countries came to the School during the year for periods up to a full year of study.

It is gratifying to report that during the academic year 85 of the medical students received scholarships averaging about $398 per student.

Mr. Stephen Crane was given the Janeway Prize, awarded to the graduate who, in the opinion of the Faculty, has ranked highest in efficiency and ability. The Borden Undergraduate Research Award was given to Dr. Nicholas P. Christy for outstanding research work during his medical course. The Dr. Harold Lee Meierhof Memorial Prize in Pathology was awarded to Drs. Frank G. Bivings and Albert M. Aboody. The Dr. William Perry Watson Prize in Pediatrics was awarded to Dr. Herman Roiphe. The Edwin G. Zabriskie Prize in Neurology was given to Dr. Charles M. Poser. Dr. Frank D. O'Neill received the Prize for Excellence in Pedodontics awarded by the Class of 1929 and the Sigma Epsilon Delta Award.

The Van Woert Scholarship Award was given to Dr. Joseph J. Tripodi. Dr. Gilbert H. Mudge was given the Joseph Mather Smith Prize. The Prize for Excellence in Operative Dentistry was awarded to Dr.

Wilson T. Worboys. The Ella Marie Ewell Medal in Dentistry was awarded to Dr. Dicran Goulian, Jr. The Frederick P. Gay Memorial Award was given to Mary E. McClain. Dr. David Shemin received the Stevens Triennial Prize. The Alpha Omega Scholarship Award was given to Dr. Kenneth K. Murakami.

It is with the greatest sorrow that we report the following deaths during the year:

Eleanor deForest Baldwin, Assistant Professor of Medicine and Assistant Attending Physician, Presbyterian Hospital, on January 16, 1951

Samuel Birenbach, Associate Professor of Dentistry, Attending Dental Surgeon, and Director of Dental Service, Presbyterian Hospital, on November 25, 1950

C. Charles Burlingame, Associate in Psychiatry and Associate Attending Psychiatrist, Vanderbilt Clinic, on July 22, 1950

A. Benson Cannon, Professor and Executive Officer of the Department of Dermatology, Attending Dermatologist and Director of Dermatological Service, Presbyterian Hospital; and Visiting Dermatologist, Francis Delafield Hospital, on November 27, 1950

T. Stuart Hart, Consultant, Presbyterian Hospital, on January 1, 1951

J. Gardner Hopkins, Professor Emeritus of Dermatology and Consultant, Presbyterian Hospital, on February 27, 1951

Jerome M. Lynch, Consultant, Presbyterian Hospital, on April 22, 1951

Walter W. Palmer, Bard Professor Emeritus of Medicine and Consultant, Presbyterian Hospital, on October 28, 1950

Miriam C. Pritchard, Lecturer in Dental Hygiene, on December 9, 1950

Francis Carter Wood, Professor Emeritus of Cancer Research, on January 5, 1951

The following designations were made during the year:

Eleanor Lee, Acting Executive Officer of the Department of Nursing, from January 1, 1951

Harry M. Rose, Acting Executive Officer of the Department of Bacteriology, from January 1, 1951

Beatrice M. Seegal, Acting Executive Officer of the Department of Bacteriology, to December 31, 1950

The following retirements became effective on June 30, 1951:

Walter P. Anderton, Associate Attending Dermatologist, Presbyterian Hospital

Adolph Berger, William Carr Professor of Oral Surgery, Attending Dental Surgeon, Presbyterian Hospital
Katharine K. Merritt, Associate Attending Pediatrician, Presbyterian Hospital
Lewis B. Robinson, Attending Dermatologist, Presbyterian Hospital
Arthur Purdy Stout, Professor of Surgery and Attending Surgical Pathologist, Presbyterian Hospital

Among the promotions made during the year were those of:

Harold W. Brown, Director of the School of Public Health and Associate Dean (Public Health), from January 1, 1951
Vincent P. Collins, Associate Professor of Radiology, from November 1, 1950
Halford Hallock, Professor of Clinical Orthopedic Surgery, from January 1, 1951
Frederick Mettler, Professor of Anatomy (assigned to Neurology), from January 1, 1951
Harry M. Rose, Professor of Bacteriology, from November 1, 1951
Frederick M. Smith, Associate Professor of Clinical Orthopedic Surgery, from January 1, 1951
Frank E. Stinchfield, Professor of Clinical Orthopedic Surgery, from January 1, 1951

Effective July 1, 1951, the following promotions were made:

Charles L. Buxton, Professor of Clinical Obstetrics and Gynecology
Lois C. Collins, Associate Professor of Radiology
André Cournand, Professor of Medicine
Virginia K. Frantz, Professor of Surgery
C. Zent Garber, Associate Professor of Pathology
Edward L. Howes, Associate Professor of Clinical Surgery
Raffaele Lattes, Professor of Surgery
David Nachmansohn, Associate Professor of Neurology
Charles A. Ragan, Associate Professor of Medicine
Joseph Schroff, William Carr Professor of Oral Surgery
Abner Wolf, Professor of Neuropathology
Ernest H. Wood, Associate Professor of Radiology

Effective March 1, 1951, the following appointment was made:

David Seegal, Professor of Medicine and Director of Research Service, First Division, Goldwater Memorial Hospital

STUDENT HEALTH SERVICE

The Student Health Service provided care for approximately 950 students who made 2,321 office visits during the year. In addition, the Personnel Medical Clinic in the same office continued to provide limited care for the clerical and technical employees. Students hospitalized in the admitting ward are normally under the care of the Student Health Office, while students admitted to the wards are under the service to which they have been admitted. This excellent student and personnel service was under the able direction of Dr. Albert R. Lamb, Jr.

The Student Health Service includes complete physical examinations of all first- and third-year medical and dental students, all first-year students in dental hygiene, occupational therapy, and physical therapy, and, on a voluntary basis, of the students in the School of Public Health. Routine chest X rays were taken on all medical, occupational therapy, and physical therapy students and on the first- and fourth-year dental students. B.C.G. vaccinations have been continued on a voluntary basis on students with tuberculin negative tests. Slightly over 50 per cent of the first-year medical class were tuberculin negative. After vaccination 87 per cent of these individuals became tuberculin positive.

SOCIAL SECURITY

During the past year the University initiated its participation in the Federal Social Security plan. All new employees and academic appointees will be obliged to join in the program.

DEVELOPMENT PROGRAM

The Development Program at the Medical Center is now being activated by the University. A detailed study of the needs of the institution has been prepared by a leading fund raising organization and is now ready for announcement. It is the hope of everyone that through the alumni and friends of the Medical School and the University the School can obtain more adequate financial aid both from current gifts and permanent endowment.

FINANCING MEDICAL EDUCATION

The problem of securing sufficient financial aid for the medical schools

of the country has engaged the active attention of a large number of governmental agencies and national organizations. In the latter group, particular mention may be made of the Commission on Financing Higher Education and the National Fund for Medical Education, Inc. The former has published its report on medical education and has arrived at conclusions which appear in certain respects to be at variance with the actual situation. The National Fund for Medical Education, Inc., has been making progress in its efforts to secure voluntary contributions for support of the medical schools of the country and will shortly make its first distribution to the schools.

The whole problem of financing medical education must be attacked vigorously, realistically, and promptly if the country is to retain the high standards of medical education and national service that have been developed during the last four decades. This challenge can only be met by a multilateral program of financing. It is obvious, but not perhaps as widely appreciated as it should be, that the professional staffs of the medical schools are rendering substantial professional and public service through the teaching hospitals associated with the medical schools. A large fraction of the time and energy of men in the clinical departments is devoted to the care of the sick while these doctors also are carrying on their educational responsibilities. There is no reason why some device should not be found to compensate these physicians and teachers for their community and public services as distinguished from their purely educational activities. It would not be difficult to arrive at an approximate value of such services in each school.

Another method for assistance in this problem is the utilization of the earnings of the full-time professional staff for work incidental to their responsibilities in the teaching hospitals and medical schools. This source of support cannot be very large without interfering with the duties and primary responsibilities of the clinical staff, but it can be, and often is, a source of revenue. Recently attacks have been made by organized medicine on some institutions and staffs which are on a salaried basis, but these plans have been in existence for many years anad have been largely responsible for building up the high quality of medical education in this country. Proper balance must be preserved between the staff of the medical school and the local profession. As long as the purpose of the Uni-

versity group is education and research as distinguished from private practice, there should be no real difficulties. Surely there is no disposition among the real leaders in the profession to hamper the program of medical education and research which has so long enjoyed the full support and encouragement of American medicine.

Some have suggested further increase of student tuition to help to a greater extent in the financing of medical education. The tuition in medical schools is already much higher on the average than in other fields of education. Furthermore, the long period of college preparation for medical studies and the need of hospital training following graduation present serious financial obstacles to most prospective medical students.

There is real evidence that the cost of medical education is not nearly so high as many believe and some leading reports state. What is often overlooked is the fact that the medical schools are rendering instruction to large groups of students other than medical and are conducting many services and research programs which, strictly, should not be chargeable against the instruction of medical students. In our own school, as an illustration, the Faculty of Medicine provides instruction for over 1,100 full-time medical, dental, public health, nursing, occupational therapy, physical therapy, and dental hygiene students. It also provides instruction for over 80 graduate students registered under the Faculty of Pure Science of the University, for over 80 visiting scholars, for more than 200 members of the house staff of the hospitals at the Medical Center, and some instruction for the interns and residents in a number of the affiliated hospitals. Instruction is given also to nearly 1,000 practicing physicians who register for postgraduate courses, largely in affiliated hospitals.

The research activities of the staff, while they vary a good deal in the different departments, represent a substantial fraction of the total work time of the staff and hence of the University budget assigned to the Medical School. The responsibilities of the clinical departments for the care and treatment of patients in the wards and clinics of the hospitals are not properly a charge against medical instruction, although control of these services is essential to the teaching program.

Financial support from alumni should be more actively developed

than heretofore because the cost of their professional education was much greater than the tuition which they paid. A number of alumni have indicated their willingness to make annual contributions in part payment of their debt to the University.

In view of the facts that graduates of the medical schools are expected to join the armed forces, and are glad to do so, that many of the graduates of this medical school, as an illustration, ultimately settle in other parts of the country and hence help to meet the health needs of the nation in their civilian capacities, it seems only reasonable that some financial assistance should be provided from federal sources. This should be looked upon as a reimbursement to the University for its contribution to the medical-health manpower needs of the country and to the furthering of knowledge in the diagnosis, prevention, and treatment of disease. Everyone is of the opinion that this type of federal assistance should be modest and at no time should reach an amount of support which in any way would threaten control of the program of the University. In the sometimes vigorous attacks of the medical profession on federal assistance and in the emotional apprehension of some University officials over nationwide assistance in support of adequate medical care for the entire population there is a tendency to overlook the fact that the attacks are upon our own government, rather than some foreign or unfriendly agency. In a democracy perhaps it is necessary that we cooperate with our government in order to make it function properly. If this were done, there would be little risk of government interference. Federal grants-in-aid for research may be cited as examples of highly satisfactory government assistance.

The several methods of aiding in the financial situation of the medical schools should be implemented through some form of multilateral support. Without reasonably adequate assistance to the medical schools, the standards of medical training are certain to go down. Such a development surely would not be in the national interest.

The quality of a medical school is determined not by the financial support of its facilities so much as by the quality of its faculty, upon whom must rest the responsibility for guiding the educational programs and hospital services. The main responsibility of the administration is to provide an environment in which these faculty members can carry on their investigative work, their clinical responsibilities, and their guidance of

students and younger members of the staff, while continually stressing that, in the educational program, emphasis must be placed on learning by the student as distinguished from teaching by the faculty. It is recognized that nothing worth knowing can actually be taught; it must be learned. Perhaps the more important duty of the administration is to produce a school that deserves public, professional, and financial support. Certainly money cannot make a great school; it can only supply the means of producing one. The important problems of modern education are intellectual more than financial.

SUPPLY OF DOCTORS

Reference to the standards of medical training introduces another factor that may also contribute to a lowering in the quality of medical education. This is the idea that there is likely to be a serious shortage of physicians in this country by 1960 and that medical schools, therefore, should increase their enrollments substantially. This idea is spread largely by enormous pressure from public sources, colleges, political agencies, and newspapers. Pressure for increased enrollment and for acceleration of medical training is a great threat to the high standard of medical education that has been built up in this country during the last forty years.

There is a great temptation to increase the enrollment of medical schools, partly for income purposes and partly to meet the outside pressure, without realizing that the production of more physicians without devising methods for their proper utilization may, in effect, seriously damage the medical and health services of this country—it still is true that one good doctor is better than two who are improperly trained, even though each may have an M.D. degree. The country needs better doctors before it needs more.

It is true that there is a shortage of physicians in some areas, particularly in certain rural communities. The distribution is faulty, but as facilities and inducements are developed in smaller and rural communities and in certain undermanned specialty fields, there will be a redistribution of professional manpower into these areas.

It is unsound to assume that physicians and expensive hospital facilities must be distributed into every small community. Modern transportation and communication have made available to many areas a higher quality

of medical, hospital, and health services than they have ever had. There is much evidence that the building and equipping of new hospitals where they are not really needed may be more of a professional liability than a financial one. It would be uneconomical and short-sighted to advocate that we train larger numbers of physicians unless we first work out some method of absorbing and distributing to needy areas the well-trained personnel which we now have. Inducing doctors to move from those congested areas where there is already an oversupply would be the quickest and most satisfactory way to meet many of the needs of the regions now short of physicians. Merely producing a surplus of doctors who will congregate in the cities cannot possibly solve the problem of medical care in the smaller and rural communities.

It is disappointing indeed to hear those who should be informed advocate that we return to the mass production of professional personnel that existed forty or fifty years ago when medical education was still in the pioneering stage in this country. If mass production methods were resumed, they could easily result in a return to the relative standards of the diploma-mill era.

Some propose a large increase in the output of medical graduates of the country without safeguards for the maintneance of proper standards of training and competence, on the general theory that overproduction of physicians would force the surplus doctors into the araes where physicians are actually needed. The idea that economic competition would result in the maintenance of high standards of medical care is fallacious, because laymen cannot be expected to have a basis for judgment of professional competence.

CURRENT MEDICAL PROBLEMS

Medical security is growing in prominence in the thinking of labor leaders, industrial and governmental officials, and the medical profession. The American people are convinced of the value of adequate medical care and sooner or later will determine that in some way the benefits of modern medicine must be made available to all. It is important for the profession, as well as the public, to realize that adequate medical care is intended for the people and not for the benefit of the profession. It is this realization on the part of medical and public leaders that has brought

forward numerous proposals for advancing this important aspect of the national welfare. It is often difficult to steer a middle-of-the-road course in these professional fields because that requires a high order of courage and judgment.

What must be avoided, however, are the proposals of the extremists who, on the one hand, advocate complete governmental control and management and, on the other, hold vigorously to the defense of the *status quo* and vested interests. Progress must be made, but it should be accomplished by evolution from the high order of medical and professional services now available in many areas of the country for people of certain economic groups. It is the responsibility of our profession, the universities, and all such agencies as the Institute of Administrative Medicine of the University to help form plans, programs, and leaders who may guide the various steps in the direction of comprehensive, prepayment medical care for the entire population.

THE INSTITUTE OF ADMINISTRATIVE MEDICINE

Medical services in this country are undergoing a rapid evolution toward making available to the entire population modern, high-quality health services of every description. While it is not possible or necessary to predict the exact forms and methods of medical care in the future, there are certain well-defined indications of the direction in which health services are moving. These various trends point clearly to considerable modifications in the future of the methods and plans of administering the facilities, personnel, and programs.

In the report of last year special attention was directed to some of the important considerations for future planning of medical services for any large population group. Provisions for medical care must envisage the rapidly developing trend toward medical insurance, including hospitalization. The recent rapid growth of prepayment medical care programs sponsored by the leading labor unions, either independently or jointly with industry, indicates a major new development in American medicine. Parallel programs are now being expanded by the life insurance and casualty companies. It has long been recognized that illness is unpredictable for the individual but that the risks of illness can be

predicted on a community-wide basis. Many plans are now developing to spread the financial cost over a large group for a long period of time through the application of well-established principles of insurance.

The hospital programs will be influenced in numerous ways by the programs of preventive medicine conducted by the various divisions of health departments, voluntary health agencies, the medical profession, public education, and many other contributing agencies. It is indisputable that preventive medical plans and control of acute infectious diseases already are relieving the hospital burden and modifying medical practice. It is the effectiveness of these programs of preventive medicine that explains in large part the pronounced shift in age composition of the population discussed earlier and which now introduces a new kind of problem for our hospitals.

The over-all concept of medical care for the country and the medical schools and universities of the community should be integrated. The primary responsibility of medical schools is the selection and education of doctors, dentists, nurses, and other personnel to meet the scientific and public duties of their respective professions. As far as practical, hospitals should be affiliated with teaching institutions. The latter, being concerned primarily with the training and preparation of physicians, nurses, dentists, and other health workers, should endeavor to help the hospitals obtain professional personnel of the highest order.

Broad problems must be evaluated and studied if hospitalization programs and adequate community-wide health services are to be carried out fully. Some of these problems are the increasing age of the population; the vitalization and expansion of outpatient services; the more effective use of home medical care; the development of adequate laboratory, diagnostic, and therapeutic units; the recognition of necessary specialization and of the grouping of skills and talents of specialists into various forms of group practice; the rapidly developing trend toward prepayment insurance for medical and hospital expenses; the increasing contributions of preventive medicine by federal, state, and voluntary agencies, as well as agencies of the medical and dental professions; and the necessary training of competent personnel in all phases of hospital, medical, and public health programs.

The effective operation of any community-wide program of health services requires proper planning and administration. Hence, there is an urgent need to establish research and teaching programs in administrative medicine. In such programs there should be provided a central staff of qualified and competent leaders who can carry on intensive studies of the various effects of hospital and medical administration and provide opportunities for the training of administrative personnel of all classes.

The Institute of Administrative Medicine of Columbia University has been established to carry out studies and instruction in the several fields mentioned. It is organized within the framework of the School of Public Health, which is the only graduate school of Public Health in this area. It has conducted programs in hospital administration, industrial medicine, sanitary science, biostatistics, epidemiology, maternal and child hygiene, and public health practice. The programs of medical education, research, and hospital services at the Columbia-Presbyterian Medical Center and in the various hospitals affiliated with Columbia University in New York and the vicinity provide admirable facilities and personnel for the study of many features of comprehensive medical care. The Schools of Dentistry and Nursing are prepared also to contribute to appropriate phases of the joint studies.

In the University itself are strong departments of business, law, economics, sociology, engineering, and other fields which can contribute to the undertaking. The large number of excellent voluntary and municipal hospitals, voluntary agencies, public health, medical, and other facilities of the New York area are available for extensive studies of a variety of problems relating to the whole hospital and community field of health services.

The Institute of Administrative Medicine functions under a Coordinating Committee which comprises the executive officers of the various major medical and public health interests represented in the program. Representatives of important outside interests such as the voluntary and municipal hospitals, the official and voluntary health agencies, and others directly concerned with the problems involved can readily be added to the coordinating group.

The Institute of Administrative Medicine of Columbia University is divided into the following five major fields of activity:

1. Hospital Administration
2. Prepayment Medical Care
3. Public Health Administration
4. Industrial Medical Administration
5. Medical School Administration

A program of this scope and character under the auspices of the School of Public Health of Columbia University would make possible a comprehensive appraisal of the needs and problems of hospitals, health services, medical care plans, and industrial medicine and public health administration. This program would be an important contribution to the development, utilization, and coordination of community-wide programs of hospital, medical, dental, nursing, and health services. It would also afford opportunities for fundamental research in these fields and for the training of administrative personnel of outstanding competence.

STAFF PROBLEMS

Too little attention is being paid in the long-term plans of medical education to the growing impacts upon the staffs of the medical schools. In recent years the emoluments and financial rewards offered to members of university research staffs by large industrial concerns have been making serious inroads in the supply of potential teachers and investigators. Lately the government has entered this same area of competition for the limited supply of men and now offers many inducements, including liberal pensions and social security, which can be met only partially by the universities. This is a part of the over-all financial dilemma of the medical schools, and it is a clear and pressing danger to the future of medical education as well.

Private practice has always been important in this situation, and it is becoming more insistent because of current inflation and the greater flexibility of income in private practice as contrasted with more modest incomes and slower increases in salaries which the universities provide. Even the development of full-time research and teaching opportunities in

the clinical departments of the medical schools is contributing to the anxiety about the future of the medical sciences.

The clinical opportunities which have contributed greatly to the rapid advance of clinical teaching and research during the last several decades have had a tendency to draw increasing numbers of well-trained young men and women into the clinical departments, from which they may later have opportunities of going into private practice, industrial medicine, government service, or other fields. The effect has been that the normal flow of young, well-trained medical men who formerly went into the basic sciences now are attracted to the clinical departments. The result is a depletion of individuals in the basic sciences who have had a medical training. All of these factors—industrial, governmental, and clinical attractions—explain in part the fact that there are over 175 full-time positions in the medical sciences that at the moment are unfilled.

This trend will have an important effect on the future of medical education because it is in the medical sciences that the fundamental contributions must be made and in which leaders must be developed if we are to continue progress in clinical medicine, industrial hygiene, public health, and the care, treatment, and prevention of disease. Too little attention has been paid to this aspect of medical education.

THE INSTITUTE OF CANCER RESEARCH

A development of the highest significance during the year was the inauguration of the Institute of Cancer Research. The opening of the Francis Delafield Hospital of the City Department of Hospitals provides facilities at least equal to any in the country for the modern care of cancer patients. It also affords excellent laboratory accommodations for clinical and laboratory research in malignancy. The four floors of new laboratories of the Medical School built and equipped for cancer investigation are of unequalled excellence. Together with the investigative activities going on in the basic sciences, and clinical departments at the Medical Center related to various aspects of malignancy, the program of cancer research is now one of the most complete in the world. Full appreciation is gratefully given to the City of New York, the United States Public Health Service, the American Cancer Society, the University, the Presbyterian Hospital, and to many others who have contributed so sub-

stantially toward making the Institute of Cancer Research one of the outstanding forces in the nation's fight against cancer.

"PREMEDICAL" EDUCATION

It is indeed gratifying to see the excellent efforts being made at present to improve, broaden, and deepen the preparation of students for medical studies. A particularly valuable program is being conducted nationally under the Survey of Medical Education by its Subcommittee on Preprofessional Education. Associate Dean Aura E. Severinghaus has been made Chairman of that Subcommittee and is working with the university and college authorities throughout the country in the fields of general education in an effort to guide programs and direct individuals with superior qualifications into the fields of the medical and health sciences. It is obvious that what we need today is more educated men and women with initiative and originality whose interests are not confined to technical skills but include humanistic and social understanding—students who are emotionally mature, sound in judgment, and motivated toward public service.

DEPARTMENT OF ANATOMY

Professor Samuel R. Detwiler, Executive Officer

Doctor Frederick J. Agate, Jr., has been promoted from Instructor to Assistant Professor and Dr. Charles A. Ely from Associate to Assistant Professor. Professor George K. Smelser has been given a year's leave of absence to serve as biologist on the staff of the London Office of Naval Research. Doctor Cornelius J. Kraissl has been given a leave of absence to reenter the Armed Forces.

The courses for first-year medical and dental students have been given without any major changes. The basic science courses for residents from affiliated hospitals have continued, with some reduction. The course in general surgical anatomy given by Dr. Jose M. Ferrer of the Department of Surgery and the course of orthodpedic anatomy given by Professor Emanuel B. Kaplan are now being given only once each year insead of twice. Each course covers a three month's period. Under the basic science program, 13 courses have been given with a total registration of 143.

Professor Adolph Elwyn has continued to carry his heavy load of teaching and has begun a third revision of the text on *Human Neuroanatomy*.

Professors Philip E. Smith and Wilfred M. Copenhaver are working on the thirteenth revision of Bailey's *Textbook of Histology*. Professor Herbert Elftman has concentrated his cytochemical research on the pituitary body. By using staining methods which depend for their specificity on the chemical characteristics of the pituitary hormones, changes in the gland can be correlated more accurately with its physiological activity. Professor Elftman has also continued to serve as a member of the Lower Extremity Committee of the research program on artificial limbs, sponsored by the National Research Council.

Professor Copenhaver is conducting experiments on the development of the amphibian heart with particular reference to structure-function correlation. He is preparing a manuscript on the atrial portion of the specialized conduction system of the mammalian heart. In collaboration with Professor Detwiler, a manuscript has been completed which deals with the growth and pigmentary responses of amphibian larvae reared in propylthiouracil.

Professor Charles R. Noback has completed a study dealing with the time of differentiation of the primary ossification centers in man. He has also completed a histochemical study of the changes which occur in the myelin sheath of peripheral nerves during secondary degeneration.

Professor Edmund Applebaum and Dr. Alexander Seelig have been engaged in a study of vascular changes in the oral tissues of rats following

experimentally produced hypertension. The material for this study was made available through the cooperation of Dr. Abbie I. Knowlton of the Department of Medicine.

Professor Harry H. Shapiro is continuing his studies on the transplantation of tooth buds in the cat. With Dr. Sidney L. Horowitz of the Department of Dental and Oral Surgery, he has completed a study dealing with the effects of the *temporalis* muscle function on the architecture of the mandible of the rat. Professor Shapiro has given lectures on applied anatomy to postgraduate dental students at the Army Medical School in Washington and at Tufts College Dental School.

Dr. Dorothy D. Johnson has completed a study of the effects of alloxan administration in the guinea pig. This study has dealt with the regeneration of the pancreatic islets and the toxic effects on the kidney and liver. Professor Charles A. Ely has continued with his investigations on the application of antigonadotrophic sera to the problems of the induction and development of testicular tumors in estrogen-treated mice of the A strain. He is also investigating the effects of lymphoid tissue antisera upon the function and histochemistry of lymphoid tissue.

Professor William M. Rogers is studying proprioceptive pathways involved in facial, mandibular, and lingual reflexes. In collaboration with Professor Shih-Chun Wang of the Department of Physiology, the structure of the floor of the fourth ventricle is being investigated in relation to the site of emetic action produced by apomorphine and digitalis.

Professors Smith and Agate are studying the effects of purified ACTH and purified growth hormone administered separately and in combination to hypophysectomized animals.

Professor Agate and Professor Samuel Graff, of the Department of Biochemistry, are investigating the relationship of various endocrine changes to normal and pathological growth. Professor Agate is studying the alterations in the hamster adrenal gland following castration and hypophysectomy and is also investigating the response of the adrenalectomized animal to stress.

Professor Detwiler has continued his researches in brain transplantations in the embryo in relation to problems of somatic motor function. He has carried out also an extensive series of experiments dealing with the dynamics of differentiation of the labyrinth. Under his direction, Mrs. May B. Hollinshead has completed an experimental study of wound healing and regeneration in the embryonic spinal cord of amphibians. Professor Detwiler has continued to serve as a member of the Science Committee of the Yale University Council.

DEPARTMENT OF BACTERIOLOGY

Professor Harry M. Rose, Acting Executive Officer

The Department regrets the loss of Professor Theodor Rosebury, who resigned to become Professor of Bacteriology at the School of Dentistry of Washington University. Professor Beatrice C. Seegal requested that she be relieved of her duties as Acting Executive Officer of the Department and was replaced in that capacity by Professor Harry M. Rose, who was promoted from Associate Professor to Professor of Bacteriology. The Department is profoundly grateful to Professor Seegal for her devoted service and inspiring leadership during her incumbency.

During the past year the laboratories of the diagnostic service performed a total of 59,514 examinations, of which 30,839 were serological tests for syphilis. These figures may be compared with 52,892 total examinations and 30,449 serological tests for syphilis done in the preceding year, 1949–1950. A significant proportion of the heightened work load is accounted for by a phenomenal increase in the number of requests for the cultural isolation and identification of tubercle bacilli. Another important factor was the assumption of responsibility by the laboratories for rendering services to the New York Orthopaedic Hospital and to the outpatient clinic of the Department of Urology. The trend toward the more frequent use of laboratory tests in diagnosis is reflected in the activities of the diagnostic services, whose cost of operation has increased commensurately.

The teaching program was greatly facilitated by an arrangement through the courtesy of Professor Harry P. Smith of the Department of Pathology whereby the large student laboratory on the fourteenth floor of the School has been made available for the second-year course in medical bacteriology. Dr. John D. MacLennan of the Department of Surgery aided in classroom instruction and gave several lectures. His valuable assistance is gratefully acknowledged. Dr. MacLennan has been promoted to Assistant Professor of Bacteriology. Professor Frank M. Burnet, Director of the Walter and Eliza Hall Institute, Melbourne, Australia, visited the Department in November and gave a delightful and stimulating lecture to the students and staff on "The General Pathology of Viral Infections."

Eight graduate students were candidates for the degree of Doctor of Philosophy during the year and three of these students, Dr. Sam M. Beiser, Dr. Alice W. Knox, and Dr. Mary E. McClain, completed the doctoral requirements and were awarded degrees.

Professor Rose continued his studies of substances in secretions of the human respiratory tract which modify experimental infection by influenza virus and other viruses. Mucoid bronchial secretion contains substances which are not specific antibodies but which, in partially purified form, are capable

of protecting mice from fatal influenzal pneumonia and also of greatly restricting the multiplication of influenza virus in the chorioallantoic and yolk sac membranes of chick embryos. The inhibitory substances also reduce the infectivity of *herpes simplex* and vaccinia viruses in chick embryos. Further work on the biological and chemical properties of nonspecific viral antagonists in secretions of the respiratory tract and the definition of their role in resistance or susceptibility to infection is proceeding under the support of the Commission on Influenza, Armed Forces Epidemiological Board. Other investigative work by Professor Rose during the year included the completion of a study of the antigenic and biological characteristics of strains of *Rickettsia akari* recovered from cases of rickettsial pox; the isolation and identification of several strains of type A prime influenza virus from patients with acute respiratory infections in the winter months; the continuation of observations on the relation of the sensitized sheep cell agglutination test to rheumatoid arthritis; and, in collaboration with Dr. Margaret Holden, a study of the effect of cortisone on infection by vaccinia virus in rabbits.

Professor Claus W. Jungeblut continued his studies of poliomyelitis. Upon invitation by the health authorities of Puebla, Mexico, Professor Jungeblut visited the area and undertook a preliminary field investigation of a local poliomyelitis epidemic. Professor Jungeblut received a Fulbright Award from the State Department to conduct research in bacteriology at the University of Leiden, The Netherlands, during the academic year of 1951–1952, for which he has been granted sabbatical leave. Professor Jungeblut and Dr. Beni Horvath undertook a detailed investigation of the kinetics of the Columbia-SK virus hemagglutination phenomenon and of its dependence upon various electrolyte concentrations.

Professor Beatrice C. Seegal, in association with Dr. Emily N. Loeb and Dr. Abbie I. Knowlton of the Department of Medicine, conducted experiments on the production of tissue damage with cytotoxic antisera in dogs. Professor Seegal has been granted sabbatical leave for the academic year 1951–1952, during which time she will continue her important work on this interesting analogue of human disease and will attempt to modify it in the rat and the dog by immunological and chemical methods.

Professor Charles L. Fox, Jr., continued his investigation of the metabolic processes involved in the inhibition of bacterial growth and, in collaboration with Dr. Samuel Raymond and Dr. Sidney Leskowitz, identified the amine produced by sulfonamide-resistant staphylococci as para-aminobenzoic acid. Further studies by Professor Fox of intracellular electrolytes revealed extreme depletion of potassium from skeletal muscle during the nephrotic syndrome. Professor Fox, in collaboration with Professor James M. Winfield of New York Medical College, made a study of potassium excretion

following major operations. A new physiological electrolyte replacement solution was devised by Professor Fox and subjected to extensive clinical trial.

Dr. Margaret Holden, in collaboration with Professor Seegal, continued her studies of mammalian cells grown in tissue culture. Cortisone did not modify the effects of tuberculin on tissues from tuberculin-sensitive animals.

Dr. Robert H. Muller, in association with Professor Rose, investigated the use of specially prepared ion exchange resins for concentrating and purifying influenza virus. In collaboration with Dr. Leonora B. Irwin of the Department of Neurology, attempts are being made to concentrate viruses of the Coxsackie group and studies with other viruses have been projected.

Dr. Solon A. Ellison, working under a post-doctorate research fellowship of the United States Public Health Service and in association with Professor Rose, undertook the study of factors involved in the recurrent manifestations of infection by the virus of *herpes simplex*. A study of a group of patients with recurrent aphthous stomatitus revealed, in confirmation of the findings of other workers, that this disease is not caused by the virus of *herpes simplex*.

Dr. Samuel Raymond concluded his study of calsol as a solvent for urinary calculi. He collaborated with Professor Fox, Dr. Alex Pinsky, and Dr. Sidney Leskowitz in showing that para-aminobenzoic acid is a metabolic product of certain sulfonamide-resistant staphylococci. In collaboration with Professor Rose, he is also attempting to fractionate human sputum and to isolate the factors which inhibit infectivity and hemagglutination by influenza virus.

Dr. Sam M. Beiser, working with Professor Elvin A. Kabat, continued the study of blood group substances from horse stomach linings. Dr. Alice W. Knox started work with Professor Jungeblut on the phenomenon of hemagglutination by murine poliomyelitis viruses.

Dr. Leonora B. Irwin, under a fellowship of the National Foundation for Infantile Paralysis, investigated the properties of an unusual filtrable, transmissible agent recovered from the feces of patients with acute aseptic meningitis. The agent apparently is not identical with any known viruses of the Coxsackie group, produces a diarrheal syndrome with death in infant mice, causes a fatal pneumonia in adult mice, and may be maintained by serial passage in chick embryos. The relation of the agent to human disease has not been determined.

Dr. James R. Trimble, a post-doctorate research fellow of the United States Public Health Service, studied the antigenic relations of *Cryptococcus neoformans* by means of agglutinin absorption tests, under the supervision of Professor Rhoda W. Benham of the Department of Dermatology. Dr. Elliott Middleton, Jr., and Elizabeth B. Middleton, in association with Professor Seegal, continued their attempts to produce nephritis in rats by the re-

peated injection of mixtures of rat kidney tissue and different serological types of hemolytic streptococci, as well as by the injection of kidney tissue treated with extracellular enzymes of hemolytic streptococci. They also studied the cutaneous reactions in nephritis patients to antigens prepared from renal glomeruli of human origin and undertook experiments attempting to induce rheumatic-like cardiac lesions in rabbits by multiple, successive cutaneous infections with different serological types of hemolytic streptococci.

Mr. Joseph Portnoy, in association with Professor William B. Sherman of the Department of Medicine, was concerned with developing an in vitro test for the antibodies associated with ragweed sensitivity in man. Mr. Herbert Wohl carried out an investigation of the reduction of tetrazolium salts by bacteria, attempting to determine the mechanism of the reduction and the localization of reduction sites. Mrs. Mildred Steinglass, working under the direction of Dr. Raymond, is investigating an unusual red pigment produced by *Clostridium histolyticum* in an iron-gelatin medium.

DEPARTMENT OF BIOCHEMISTRY

Professor Hans T. Clarke, Executive Officer

The teaching personnel and methods of the Department of Biochemistry have been essentially the same as in the previous year.

Instruction in biochemistry has been given to the first-year medical and dental classes and to 58 students under the Faculty of Pure Science. Of these, 36 were graduate students working towards the degree of Doctor of Philosophy in Biochemistry: six at the introductory level and 30 in advanced work. Of the 22 students with major interest other than biochemistry only 4 received laboratory instruction.

During the academic year 10 graduate students completed all requirements for the degree of Doctor of Philosophy. This represents more than twice the number that can be expected to graduate in future years because, owing to limited facilities, admission of graduate students to the full introductory course in biochemistry is now restricted to about 4 biochemistry majors and 4 students in other medical science departments of the School.

The staff members of the Department have continued to be productive in research. Professor Erwin Brand and his assistants have prepared a number of synthetic polypeptides and have studied their rotatory powers; the results indicate that predictable regularities may be disclosed.

Professor Erwin Chargaff and his research group have now been installed in new and commodious quarters in the Institute of Cancer Research. Their studies of the structure, composition, and function of nucleic acids are of current importance to genetics and bear directly on problems of cancer. In addi-

tion to this major activity Professor Chargaff has devoted attention to the biological functions of lipids, lipo-proteins, and isositol. He and Dr. Stephen Zamenhof have collaborated with Professor Hattie E. Alexander of the Department of Pediatrics in an investigation of the transforming factor in *Hemophilus influenzae*. He has also collaborated with Professor Margaret R. Murray of the Department of Surgery in a study of the chemistry of cell division.

Professor Hans T. Clarke has directed an exploratory study of the carboxymethylation of proteins and the application of this reaction to the identification and estimation of terminal amino acids in proteins and peptides. He has also continued to supervise work on the chemistry of bacitracin. Professor Goodwin L. Foster has investigated the metabolism of methylamine. Professor Maxwell Karshan has continued his studies of the etiology of periodontal disease, particular attention being devoted to the effects of ovarian function.

Professor Edgar G. Miller, Jr., much of whose time was taken up by his duties as a member of the Admissions Committee and other committees of the School, acted as responsible coinvestigator on Professor Brand's project supported by the contract with the United States Navy. Professor Miller also acted as Scientific Advisor to Dr. Victor Ross on a study of the reaction between salmine and other proteins.

Professor David Rittenberg has determined the rates of protein synthesis and urea formation in normal man. In conjunction with Dr. David B. Sprinson he has undertaken a fundamental study of the mechanism of enzyme action and, with Dr. Irving M. London of the Department of Medicine, of the rate of cholesterol synthesis in a case of nephrosis. Dr. London has studied the synthesis of heme in hemolyzed duck blood. He has also demonstrated the formation of antibodies in vitro, the first example of synthesis of a specific protein outside the intact organism. Dr. Sprinson has investigated the biosynthesis of methyl groups from specific carbon atoms of glycine, serine, and threonine and has studied the conversion of serine into other amino acids.

Professor David Shemin has continued his studies on the biosynthetic formation of porphyrins and has established the intimate relationship of this process to the citric acid cycle. He has also investigated the utilization of glycine and other simple organic compounds for the biosynthesis of porphyrins and purines.

The Department has given working facilities to two visiting fellows, Dr. Christoph Tamm of the University of Basel, Switzerland, and Miss Berta Gandelman of the University of Santiago, Chile.

Speakers in the Departmental seminars included Dr. Aaron Bendich of the Sloan Kettering Institute, Dr. A. C. Chibnall, Professor of Biochemistry,

Cambridge University, Dr. Dean B. Cowie and Dr. E. Bolton of Carnegie Institute, Dr. Waldo E. Cohn of Oak Ridge National Laboratory, Dr. Eric H. Pollaczek of Northwestern University, Dr. Hugh Sinclair, Professor of Biochemistry, Oxford University, and Dr. J. J. Stekol of Lankenau Hospital Research Institute.

DEPARTMENT OF DENTAL AND ORAL SURGERY

Professor Maurice J. Hickey, Executive Officer

The Department reports with profound regret the death of Dr. Samuel Birenbach. Dr. Birenbach joined the oral surgery staff in 1922 and rose to the rank of Associate Professor, Head of the Division of Oral Surgery, and Director of Hospital Dentistry. His untimely death is a serious loss to the Department and to the students in generations to come.

The demand for admission to the School of Dental and Oral Surgery remains at about the same level as last year. A total of 666 applications were completed from which an entering class of 40 students was accepted. These applications were received from 30 states, the District of Columbia, 1 territory, and 10 foreign countries. Accepted students represented 6 states, 1 territory, and 3 foreign countries.

The Admissions Committee has been studying the possibility of using additional criteria in the selection of students. These include the Dental Students Aptitude Test given by the American Dental Association and a more careful evaluation of visual acuity. It is interesting to note that 45.4 per cent of those students receiving "B" or better in technical subjects possess visual acuity in excess of 20/20.

Courses for dental clinic hygienists registered 7 students representing 3 states and 1 territory.

DENTAL CLINIC

The Dental Clinic continues to function under the direction of Professor Irvin L. Hunt.

During the twelve-month period from May 1, 1950, to April 30, 1951, the Dental Clinic admitted a total of 14,719 patients. Of this number, 6,085 were new patients and 8,634 were former patients readmitted. There were 2,342 admissions referred from the hospitals of the Medical Center, 529 students and teachers from Columbia University, and 227 personnel and 11,620 admissions from other sources. This represents an increase of 2,273 patients registered when compared to the previous year.

During the year 2,024 operations were completed in Operative Clinic and 706 procedures were completed in the Prosthetic Clinic. The X-ray Clinic made 66,096 exposures.

DIVISION OF OPERATIVE DENTISTRY

The responsibility for the functioning of the Division of Operative Dentistry is assumed by Professor Carl R. Oman.

Dr. Steven S. Scrivani has joined the Army Dental Corps, having been granted a leave of absence, and is now in Korea. Professor Daniel M. Kollen has resigned because of illness. He will be greatly missed and we deeply regret the necessity for his leaving. Dr. Joseph Leavitt has been appointed Instructor in Dentistry and is assigned to Endodontia.

Through the generosity of the Committee for the Establishment of the Ogur Memorial, the sum of $3,700 was turned over to the Dental School. This sum has been used to create a small but highly effective unit known as the Ogur Memorial Room. It was dedicated and presented to the School on Dean's Day, February 16, 1951.

An innovation to be put into effect will be the correlation of the teaching of the biochemical and bacteriological phases of dental caries with operative techniques. This should result in a better understanding of the nature of dental caries and a probable improvement in the students' ability to recognize and treat carious lesions of the teeth.

Professor Oman is collaborating with Dr. Henry Bartels in the study of drugs used in cavity sterilization. Dr. Harold Sherman and Dr. Joseph E. Fiasconaro are working with Professor Harry Grunfest of the Department of Neurology on the problem of response to pain in operative procedure and the efficacy of anesthetics in obtunding pain.

DIVISION OF ORAL SURGERY

The activities of this Division were directed by Adolph Berger, William Carr Professor of Oral Surgery. Drs. Robert Kroll, Kourken Daglian, and Stanley Nief were granted leave of absence for the duration of their military service.

The postgraduate course in oral surgery on a two-year basis is proving to be a sound advance in teaching. The necessary time limitations placed on undergraduate teaching of oral surgery require that this important phase of dentistry be taught in the postgraduate years. The future development of dental and oral surgery will be dependent upon the quality of postgraduate education.

Problems in clinical research play an important part in the activities of the Division. Problems being actively studied include an evaluation of the clinical effects of various antibiotics in oral infection and treatment of the prolonged chronic parotitis. Members of the Division have given lectures throughout the country and continue to contribute to dental literature.

DIVISION OF ORTHODONTICS

The Orthodontic Division has functioned under the direction of Professor Arthur C. Totten. The curriculum has been revised and strengthened in order to provide better teaching. Obtaining the Coreco camera has aided greatly in research and teaching. It would be to the advantage of the Division if a competent physical anthropologist and a competent group of men were available for a thorough child study and correlation. The Division should have a crippled children's clinic in order to take proper care of the cleft palate, cleft lip, and cerebral palsy children.

The teaching of prevention and correction of simple types of malocclusion and of adult orthodontics for restorative procedures have been most favorably received by the undergraduate students. This type of service by the general dental practitioner is a very important adjunct to his professional care.

The postgraduate teaching by this Division was expanded to include two new short courses. The courses were limited in admittance to those orthodontists who have already demonstrated accomplishment in this phase of dentistry. Sixteen students completed the fifteen-month course and were awarded certificates. Sixty-two students attended other postgraduate courses.

The Department of Anatomy and the Orthodontic Division are continuing their research in the problems of the temporomandibular joint. The Division is continuing its work on "A Serial Study of Occlusion in Mixed Dentition." This is its fourth year of work on the project.

The Division is also continuing a research project to determine the effect of orthodontic appliances on the caries rate in children. This is its second year of work on this project. At the annual meeting of the American Association of Orthodontists held in Louisville, Kentucky, the postgraduate students gave a table clinic. The Division held a one-day seminar and five evenings of "Information Nights" for the members of the Columbia University Orthodontic Alumni Society. These meetings were exceptionally well attended and members came from various parts of the United States and Canada.

Contributions of the staff include numerous scientific papers and lectures and membership on many professional committees.

DIVISION OF PEDODONTICS

The accomplishments of this Division under the direction of Professor Ewing C. McBeath are again gratifying. The assignments of voluntary clinical instructors were again well balanced. This accounts for the high degree of individual instruction so essential for productive results in pedodontics. The voluntary staff included Dr. William A. Verlin, Dr. Julian Schroff,

and Dr. Edward S. Luboja. We were fortunate this year in having another instructor, Dr. Hyman A. Citron, one of our honor students of the class of 1950.

Each child patient was considered a comprehensive case, and the student was held responsible for an appraisal of the general physical condition in addition to the dental status. Seventy-one children were admitted to the clinic and the number of visits totalled 716.

The research projects listed in last year's report are still under way. Contributions of the staff include responsibilities in the state and local professional organizations as well as numerous papers and lectures.

DIVISION OF PROSTHETICS

Under the direction of Professor Gilbert P. Smith the activities of the Prosthodontia Division for the academic year centered on undergraduate teaching. As in other years the teaching load was so great that most of the available time of the teaching staff was used. Courses were conducted in a manner similar to last year, with continued effort toward improvement of course content and teaching material. The staff has been depleted by the granting of a leave of absence for military service to Dr. Ennio L. Uccellani and by the resignation of Professor Saul Misheloff. The loss of the services of these men will be felt this coming year.

The Surgical Prosthesis Clinic conducted by Professor Oscar E. Beder and Dr. Sebastian Bruno operated at capacity and has an extensive waiting list of cases. The Dental Materials section, conducted by Dr. Herbert D. Ayers, Jr., has continued research on new dental impression materials, plastics and waxes. The course on restorative dentistry for dental hygienists was conducted by Dr. Howard A. Arden. Dr. John J. Lucca continued his work supported by "The Isidore Stern Memorial Gift for Comparative Study of Partial Dentures" and completed a syllabus covering basic procedure in precision attachment partial dentures. Professor George W. Hindels has continued the survey of partial dentures. Dr. Lucca acted as Chairman of the Temporomandibular Joint Clinic and has performed restorative therapy for cases treated by the group.

The remodelling of the student processing laboratories and the concentration of this work into one room under the supervision of Mr. Robert Wrong was a major improvement accomplished this year. It has resulted in more efficient work by both staff and students. The relocation of the Staff Room has given the staff more space and improved facilities. Laboratories for technique courses are inadequate and are a continued handicap to efficient teaching.

Extracurricular activities included many outside lectures, scientific papers, and participation in professional activities.

RESEARCH LABORATORY

This essential activity is directed by Professor Barnet M. Levy. Since July, 1950, the Research Laboratory has shown a remarkable improvement, both in its research activities and in its productivity. Activities are tremendously handicapped because of extremely cramped quarters and limited facilities.

The main laboratory now provides working space for six full-time and three part-time workers. This is an impossible situation which looks even darker when we realize that two additional technicians will probably be engaged in research projects supported by the American Cancer Society and the United States Public Health Service. The research activities of the Department play a vital role in the future of dental education. The Division has produced a series of excellent research contributions during the year, particularly the effect of vitamin B complex deficiency on the jaws of rats by Drs. Robert J. Gorlin and Barnet M. Levy; experimental studies on the development of the mandibular arch in *Amblystoma punctatum;* a comparative histologic study of the early reaction of skin and mucous membrane surfaces of the lips of mice to a single topical application of the carcinogen 9, 10-dimethyl-1, 2-benzanthracene by Drs. Levy, Gorlin, and Robert Gottsegen; the effect of total body X radiation on the long bones of the hamsters by Drs. Levy and Robert Rugh; penicillin sodium capping of vital cariously exposed pulps in adults by Dr. Austin H. Kutscher; folic acid treatment of a case of prolonged acute gingival hemorrhage by Drs. Kutcher and Daniel E. Ziskin; local anesthetic proporties of pyribenzamine hydrochloride; treatment of some chronic lesions of the oral mucous membranes and the oral manifestations of toxicity of antibacterial therapy.

DIVISION OF STOMATOLOGY

This Division, comprising the sections of Periodontia and Diagnosis and Radiology, is directed by Professor Lewis R. Stowe. The section of Periodontia is headed by Professor Frank E. Beube. The section of Diagnosis and Radiology is directed by Professor Edward V. Zegarelli.

The staff members of the section of Periodontology have participated as clinicians and lecturers at various meetings of dental organizations throughout the country and abroad. Some have given courses at district societies.

Quarterly meetings have been arranged between the periodontia staff of the Beth Israel Hospital in Boston, under the directorship of Henry M. Goldman, and the staff of the section of Periodontology. The first meeting was held in April, 1951. The purpose of the sessions is an attempt to resolve some of the controversial problems in the field of periodontology through investigations carried on jointly by both groups.

DIVISION OF ORAL DIAGNOSIS AND ROENTGENOLOGY

Professor Zegarelli has recently been appointed dental consultant on the staffs of the Francis Delafield Hospital and the Montrose Veterans Administration Hospital. Professor Joseph A. Cuttita and Dr. Herbert F. Silvers have received appointments as consultants on the staff of the Castle Point Veterans Administration Hospital. Dr. Wesley Halpert is the recipient of a fellowship in biochemistry and as a consequence has had to curtail his time in Diagnosis.

The staff have given numerous lectures and papers during the year and have served on national committees or as advisors to government agencies.

Dr. Harold M. Syrop from the Veterans Administration is spending a year in this Division for the purpose of obtaining training in the field of Oral Diagnosis. He is carrying out a research project on idiopathic cysts of the jaws.

Dr. Jean Fontaine, sent to us from the University of Montreal School of Dentistry, is working on a project entitled "periapical fibro-osteomas." Dr. Fontaine will return to the University of Montreal as a full-time worker.

Clinical research on obscure and vaguely understood soft tissue lesions has been continuing with the active aid of Dr. Herbert Silvers and Dr. Austin Kutscher.

Research on bone abnormalities in the nature of fibrous dysplasias is also continuing with the addition of new cases compiled during the year.

Monthly staff meetings have been held during the past year. The following individuals have appeared before our group: Professor Maurice Lenz of the Department of Radiology, Professor Frank E. Beube, Professor Beatrice M. Kesten of the Department of Dermatology, and Professor Harry M. Rose of the Department of Bacteriology.

DIVISION OF DENTAL HYGIENE

Courses for dental hygienists, under the direction of Professor Frances R. Stoll, registered 11 students in the class of 1951 and 7 students in the class of 1952. At the time of this report there are 10 candidates who have been accepted for the class of September, 1951.

Two clinics were in operation during the year to provide practice in dental prophylaxis. The Dental School Clinic was supervised by Miss Barbara Fink, assisted by Mrs. Gloria Jacklyn. The clinic at 15 Amsterdam Avenue was supervised by Miss Evelyn Hannon, assisted by Mrs. Gloria Jacklyn. Patients for the Amsterdam Avenue clinic include children from New York Foundling Hospital (sodium fluoride series group), Woodycrest Home, and Public School 141. Additional clinic services were provided in St.

Mary's Home for Boys in Syosset, New York, and for the Washington Square Home for Unmarried Mothers.

During the Spring Session senior students were assigned to schools in Nassau County in which dental health programs are in progress under the direction of competent dental hygiene teachers. Each student received seventy-five hours of observation and teaching.

Approximately three hundred folders containing educational and guidance materials have been placed in the files of colleges in the eastern part of the United States. The present applications have come from a number of schools who used the guidance materials sent to them. Those who attended the conferences have influenced several candidates to apply. These activities will be continued next year as there is a definite need to introduce the profession of the dental hygienist to college women if the registration is to reach the maximum capacity of the School.

Four scholarships of $300 each are offered to candidates by the Dental Hygienists Alumnae Association of Columbia University. These scholarships are being offered to stimulate interest among college women who have completed their sophomore year. The Alumnae Association hopes to continue these scholarships for another year by voluntary contributions and by money raised at Alumnae Day and other functions.

During the year a study was undertaken by Professor Stoll and Miss Fink titled "Digest of State Laws Pertaining to Dental Hygienists." The purpose of the digest is to show the main provisions which are made in existing dental acts and the broad actions of all the states pertaining to the practice of dental hygienists. It is to serve as a guide in the amending of state laws. It will be a historical documentary tabulation of the development of the dental hygienist movement in the United States. The various sections will then be submitted to each state for verification.

DEPARTMENT OF DERMATOLOGY

The past year has been one of tragedy and disruption for the Department of Dermatology. The sudden death from acute myocarditis on November 27, 1950, of Professor A. Benson Cannon ended a leadership under which the Department has made great progress. During the ensuing period of confusion Professor Emeritus J. Gardner Hopkins was a bulwark to the entire staff and carried on Professor Cannon's investigation into the effectiveness of ACTH and cortisone in diseases of the skin. His death on February 27, 1951, also of heart disease, was a second staggering blow. Professor J. Lowry Miller has acted in matters pertaining to the clinic and the hospital and in

many aspects of the College activities, pending the appointment of an executive officer.

In the spring the Department moved into more adequate quarters on the sixteenth floor of the School. Thus was fulfilled a long felt need for sufficient space to accommodate the Department on one floor.

Dr. F. Philip Lowenfish was appointed codirector of the Dermatology Service of City Hospital following the death of Professor Cannon, who had served as Chief of Service there since 1926.

Professor Cannon's motion picture on "The Management of Precancerous and Cancerous Lesions of the Skin" was completed just prior to his death and was shown posthumously at the American Academy of Dermatology and Syphilology in December.

Professor Rhoda W. Benham and her assistants continue to give the course in medical mycology, taken this year by nineteen physicians and graduate students. Professor Benham lectured on mycology to the second-year students during their bacteriology course and Dr. James R. Trimble lectured to the nurses on the same subject. Miss Margarita Silva has been working with Professor Benham on comparative nutritional requirements of the dermatophytes, in particular *Trichophyton mentagrophytes, T. rubrum, T. megnani,* and *T. gallini.* Mrs. Paulette McCormack, in addition to handling a considerable volume of courtesy consultations for the hospital, has been making a comparative study of known pathogenic forms with a Phialophora-type organism isolated from a transient lesion about the ear. Dr. Jose Miranda, a Squibb research fellow from Brazil, has been working with Professor Benham and Dr. Bernard O. Dodge on a Beauveria capable of parasitizing wood borers. All the members of the mycology staff have been experimenting with the new Hotchkiss-McMamus stain for demonstration of fungi in tissue.

A preliminary report of a clinical and mycologic research project carried out by Dr. Roberts B. Pappenfort and Mrs. Edith Schnall on the association of moniliasis with aureomycin therapy appeared in the Department's publication *The Biopsy* in September. This issue of *The Biopsy* was devoted to the subject of medical mycology and carried, in addition to the report, articles by Professor Hopkins on "Present Day Problems in Mycology"; by Professor William M. Huber on "Gungous Diseases of the Eye"; a history of the Laboratory of Medical Mycology by Professor Benham; and a preliminary report on "The Occurrence of *Cryptococcus Neoformans* in Certain Lymphoblastomas" by Dr. James R. Trimble.

Professor George C. Andrews recorded a lecture on "Precancerous Lesions of the Skin and Mucous Membranes in Preventive Medicine" for one of a series of broadcasts directed toward the general practitioner under the auspices of the New York Academy of Medicine. Professor Beatrice M. Kesten has

devoted particular attention to the effect of the corticosteroid compounds on allergic dermatoses and also continues her studies on light sensitivity and its passive transfer to normal subjects. With the assistance of Drs. Carl Lingamfelter and Harry Van Velsor, Professor Kesten presented an exhibit on "Skin Manifestations of Diseases of the Muscoloskeletal System" at the Graduate Fortnight of the New York Academy of Medicine.

Professor Miller, Dr. Meyer H. Slatkin, and Miss Balbina Johnson of the Department of Surgery showed an exhibit on "Antibiotics in Topical Therapy" at the annual meeting of the American Medical Association in June, 1951. At the same meeting Dr. Helen O. Curth had an exhibit on "Pseudo-Acanthosis Nigricans" and Professor Barker and Dr. Van Velsor read a paper on "Penicillin Treatment of Latent Syphilis."

The State of New York again awarded a grant to the Department's Serology Laboratory to carry forward research on the treponemal immobilization test in syphilis. Mr. Joseph Portnoy of the United States Public Health Service conducted the work initially, under the direction of Professor Cannon, but left during the year to take up duties elsewhere. The work is being carried on by Dr. Rose R. Feiner. A report is now being printed on the results of some 350 tests on sera from this and other institutions.

Professor Benham's grant from the United States Public Health Service for fungous research was renewed, as was a grant from the American Cancer Society in support of Dr. Helen Curth's work on acanthosis nigricans.

Drs. Emmett S. Lupton and Meyer Slatkin assumed charge of the syphilis program under Professor Cannon and have continued the systematic evaluation of dosage schedules in the penicillin treatment of early, latent, and late syphilis and neurosyphilis, the last with the cooperation of the Department of Neurology. A report of extended studies on penicillin levels in the blood was published in April and one on the penicillin treatment of neurosyphilis is in preparation by Dr. Slatkin and Dr. Alfred Gallinek of the Department of Neurology. Studies of an experimental preparation of hypo-allergenic penicillin have been carried on under Dr. Lupton's direction in a total of 220 cases, 21 of which have been sensitive to other types of penicillin. With the departure of Dr. Lupton to practice in North Carolina, Professor Miller has assigned the direction of all phases of the work in syphilis to Dr. Slatkin.

The Syphilis Symposium for fourth-year students was held on three afternoons in March. The Department was fortunate in having the cooperation of the following doctors from other institutions: Dr. Edward D. DeLamater, University of Pennsylvania; Dr. Earl Clark, St. Luke's Hospital; and Dr. Edwin P. Maynard, Jr., Long Island College of Medicine. Each presented a discussion of the particular phase of syphilis on which he had done special work. Dr. Robert A. Nelson, originator of the treponemal immobilization

test, spoke on that subject following an excellent demonstration of the technique by the workers from our serology laboratory now researching on the test.

Drs. Lupton, Robert Morgan, Ralph Grover, and Andrew P. Sackett completed their training and passed the examinations of the American Board of Dermatology and Syphilology. Dr. Sackett leaves in June to become Director of Dermatology of the United States Marine Hospital in Seattle, Washington. Dr. Charles F. Post was granted leave of absence from April, 1951, to assume the post of Associate Director of Dermatology of the United States Marine Hospital at Stapleton, Staten Island.

Two members of the Department were elected to membership in the American Dermatological Association: Professors Leslie P. Barker and Beatrice M. Kesten. Professor Kesten is the first woman to be so honored.

Dr. Andrews was promoted from Associate Clinical Professor to Clinical Professor; Dr. Miller from Assistant Clinical Professor to Associate Clinical Professor; Dr. William M. Huber from Instructor to Assistant Clinical Professor; Dr. Carl T. Nelson from Instructor to Assistant Professor of Clinical Dermatology; and Dr. Emmett S. Lupton was appointed Assistant in Dermatology.

DEPARTMENT OF MEDICINE

Professor Robert F. Loeb, Executive Officer

On October 28, 1950, Dr. Walter W. Palmer, Bard Professor Emeritus of Medicine, died unexpectedly on his farm at Tyringham, Massachusetts. With the passing of Professor Palmer, American medicine lost one of its great leaders and Columbia University lost a staunch friend and a wise counsellor of rare integrity and generosity. Professor Palmer's contribution to medical research, his devotion to high standards of medical education and patient care, and his capacity to seek out and cultivate young physicians of great promise brought great distinction to the Department of Medicine of which he was Executive Officer from 1921 to 1947. Professor Palmer has left a fine and enduring tradition in the Department which reflects his spirit, as well as his sterling qualities of character and scholarship.

Professor Eleanor DeForest Baldwin died on January 16, 1951, after a long illness. A graduate of the College of Physicians and Surgeons, Professor Baldwin devoted many years to the study of cardiorespiratory disease by quantitative physiological methods and made notable contributions in this important field. She established the Cardiorespiratory Laboratory in the Presbyterian Hospital. Her enthusiasm and devotion to her work were inspiring to her many collaborators. Professor Baldwin's loyalty and interest

are manifested by her generous legacy to Columbia University for work in the Department of Medicine.

This year Professor Walter P. Anderton retires after a long and gratifying career as teacher and clinician and as a public-spirited physician who has given unstintingly of his energy and wisdom to the cause of better medicine in the community. Dr. Karl Meyer, with a grant from the Rockefeller Foundation, is making a protracted visit to laboratories in England and on the Continent and is giving a series of lectures in a number of universities.

On December 31, 1950, Professor Alexander B. Gutman resigned as Director, First Division, Research Service, of the Goldwater Memorial Hospital to assume the position of Physician and Director of Medical Research at Mount Sinai Hospital. Professor Gutman retained his professorship in the University and will continue to participate actively in the teaching program. Dr. David Seegal, who was the first Director of the Columbia Research Service at the Goldwater Memorial Hospital and who developed its highly productive program in research and teaching in degenerative diseases, has been appointed Professor of Medicine and has again become Director of the Columbia Research Service. Dr. Arthur Wertheim has been appointed an Assistant Professor of Medicine at the Goldwater Memorial Hospital. Professor Robert Berliner has resigned to take a research position at the National Heart Institute.

Dr. André Cournand has been promoted from Associate Professor to Professor of Medicine at Bellevue Hospital. Professor Charles A. Ragan has been promoted from Assistant Professor to Associate Professor. Drs. Abbie I. Knowlton, Irving M. London, and Gilbert H. Mudge have been advanced from Associates to Assistant Professors. Dr. Joseph W. Jailer has been promoted from Associate to Assistant Professor of Medicine, assigned to the Department of Obstetrics and Gynecology. Dr. Irene Ferrer has been promoted from Associate to Assistant Professor of Clinical Medicine at Bellevue Hospital. Dr. Alfred Steiner, Associate, becomes Assistant Clinical Professor of Medicine at Goldwater Memorial Hospital. Dr. Albert R. Lamb, Jr., is acting Chief of the Group Clinic, where he is in charge of teaching. Dr. John J. H. Keating, Clinical Professor of Medicine at St. Luke's Hospital, has resigned in order to become a Trustee of the University. Professor Keating has greatly strengthened the relations between the medical service at St. Luke's and the College of Physicians and Surgeons.

During the last year a number of foreign fellows have been guests of the Department. These have included Dr. Richard I. S. Bayliss, Rockefeller Foundation Fellow from the Post-Graduate Medical School in London; Dr. D. Geraint James, Middlesex Hospital Fellow from London; Dr. Derrick Rowley, Commonwealth Fellow, St. Mary's Hospital, London; Dr. Pieter Smit from Durban, South Africa; Dr. de Guise Vaillancourt, Fellow of the

Canadian Arthritis and Rheumatism Society. There have also been fellows of the National Research Council, American Cancer Society, American College of Physicians, the John and Mary R. Markle Foundation, the New York Heart Association, and the National Institutes of Health working in the Department of Medicine.

Dr. Stuart W. Cosgriff was charged with the responsibility for organizing the Emergency Committee for the Medical Center and served as Chairman of the Committee for Civil Defense of the College of Physicians and Surgeons. Effective plans and teams for action have been established with full cooperation of members of the Faculty and the staff of the Presbyterian Hospital. Lectures on management of casualties have not only been given at the School but to hundreds of physicians in the New York area.

With the national emergency and the limitations set for training of recent graduates of medical schools, it has unfortunately been necessary to abandon the two-year integrated program for interns on the Medical Service of the Presbyterian Hospital. This constitutes an unavoidable step backwards in medical training which will inevitably have its repercussion in the years to come. It is to be hoped that other inroads on the high standards of medical training at Columbia may be avoided despite inflationary trends and external pressure to increase student enrollment. Curtailment of the full-time nucleus in the Department would lower the caliber and the intensity of our medical research. The philosophy and even the techniques necessary for the proper training of competent physicians are dependent upon the quality of this research. The level of patient care in the community will reflect any lowering of the standards of our teaching program.

There have been no major changes in the curriculum of the Department during the past year. The third-year didactic lectures were given by outstanding members of the fourth-year class. This device in teaching is proving to be highly successful. The elective course in medical therapeutics and applied pharmacology under the direction of Professor Hamilton Southworth and Professor Alfred Gilman of the Department of Pharmacology has proved to be of increasing interest to the third- and fourth-year students.

A new laboratory is approaching completion. Constructed with the support of the Baruch Committee on Physical Medicine, it was designed by Professor Robert C. Darling with controlled temperature and humidity and with a treadmill. This laboratory will afford opportunities for controlled physiological observations on patients in convalescence and in a variety of disease states. With relocation of laboratories of the Department of Dermatology and with space made available for cancer research, considerable relief has been brought to the problem of overcrowding in the laboratories of the Department.

It is gratifying to report that the program of research has continued at a

high level and that significant progress has been made in a number of widely diverse fields of importance. Professor Stanley E. Bradley, with Professors Emanuel M. Papper and David W. Habif of the Department of Surgery, has made comprehensive studies of changes in renal function during anesthesia and operation and has found evidence of tubular dysfunction suggesting the importance of hormonal factors. Professor Bradley, with Drs. Cheves McC. Smythe and James F. Nickel, has demonstrated that epinephrine and nor-epinephrine infusions reduce the renal excretion of sodium and potassium and appear to augment water excretion with increase in glomerular infiltration. These effects are not modified by high spinal anesthesia or Addison's disease, suggesting that these hormones act directly on the renal tubules. Professor Bradley and Professor Arthur Blakemore of the Department of Surgery have continued studies on physiological alterations consequent to portocaval anastomoses in man. Dr. Smythe and Dr. Hugh F. Fitzpatrick in the Department of Surgery, with their technique of "regional heparization of the portal vein," have found variations in oxygen content and pressures in the portal vein in response to food and a variety of chemical agents. Drs. Nickel, Preston B. Lowrance, and Edgar Leifer have been studying the mechanism by which nitrogen retention is augmented in certain patients with renal insufficiency upon salt deprivation.

Professor John V. Taggart and Professor Gilbert H. Mudge have continued their studies on the metabolic aspects of active cellular transport mechanisms in the kidney. Professor Mudge has demonstrated that the passing of potassium into kidney cells and the corresponding removal of sodium is a function of temperature, oxygen uptake, and the substrate of the medium. He has also studied inhibitors of this transport. Professor Taggart has been studying isolated enzyme systems which may serve as the instruments of active transport. Professor Taggart has also carried on definitive studies on the binding of para-amino hippurate by serum proteins and has devised a nomogram which will facilitate studies involving this substance in evaluation of kidney function.

Professor London has continued studies in porphyrin metabolism. In investigating the mechanisms of their synthesis, he has shown that heme can be synthesized in vitro in hemolyzed erythrocyte preparations. He has also demonstrated in studies on the origin of bile pigment that protoporphyrin can be converted to stercobilin in the mammalian organism. In studies on cholesterol metabolism, Professor London has found evidence that the serum cholesterol molecules in the nephrotic syndrome have a survival time which is markedly prolonged over the normal. Together with Dr. Helen M. Ranney, Professor London has developed a technique for demonstrating antibody formation in vitro in surviving tissue.

Professor Karl Meyer, together with Dr. Maurice Rapport, Dr. Bernard I.

Weissman, and Mr. Alfred Linker, has continued investigation of the mucopolysaccharides of the ground substance of connective tissue and of their enzymatic breakdown. In the course of these studies, the group has for the first time crystallized a disaccharide derived from hyaluronic acid. Studies have also continued on the standardization of assays of hyaluronidase and on the various sulfated polysaccharides of the body.

Professor George A. Perera, with Professors Charles A. Ragan and Sidney C. Werner, has made comparative studies of the metabolic effects of 17-hydroxycorticosterone and cortisone in man. With Professor Ragan, Professor Perera has gained further evidence that the action of sodium chloride on blood pressure is mediated through an adrenal mechanism. Further studies by Professor Perera on the natural history of hypertensive vascular disease have shown that the average age of onset in a group of one hundred patients was thirty-two years and the average duration of life was nineteen years. Dr. Kermit L. Pines, with Professor Perera, has studied the effect of DCA on normotensive individuals and has continued his studies on the comparison of sodium excretion in response to thicyanates in normal and hypertensive subjects. Dr. Pines with Professor Mudge has completed a study on renal tubular acidosis.

Professor Abbie I. Knowlton, with Dr. Emily N. Loeb and Professor Beatrice C. Seegal of the Department of Bacteriology, has made a comparative study of the effects of cortisone and DCA on regimens with and without salt in adrenalectomized animals. With Professor Perera, Professor Joseph W. Jailer, and Dr. Calvin H. Plimpton, Professor Knowlton has made detailed studies on the effect of cortisone in Addison's disease.

Drs. Marcel Goldenberg and Maurice Rapport have studied the renal excretion of nor-epinephrine and epinephrine in hypertensive patients, in patients with Addison's disease, and in patients with pheochromacytoma. With Dr. Henry Aranow, Jr., work was continued on the non-humoral phase of hypertension in patients with pheochromacytoma. Further studies with Dr. Goldenberg's benzodioxane diagnostic test have been carried out. Professor Jailer, in his laboratory in the Department of Obstetrics and Gynecology, has continued studies on the isolation of adrenal-like hormones from the placenta. With Dr. Jean Louchart, it was shown that the liver, spleen, and kidney are capable of inactivating cortisone in vitro whereas this is not true of other tissues. Dr. Bayliss has been carrying on observations on the separation of urinary corticosteroids.

Professor Werner has shown that repeated tracer doses of I^{131} have distinct therapeutic effects in a number of patients with hyperthyroidism. Together with Professor Virginia K. Frantz of the Department of Surgery and Dr. Howard B. Hamilton, Professor Werner demonstrated that ACTH and cortisone cause disappearance of inflammatory cells in Hashimoto struma.

Professor Werner also demonstrated that the hypermetabolism induced by ACTH and cortisone is apparently not mediated by the thyroid gland. Dr. Aranow has been carrying out observations on the value of 1-methyl-2-mercaptoimidazole as a drug for the control of hyperthyroidism. Professor Kenneth B. Turner has continued studies on the enzyme esterifying cholesterol in vitro, and, in addition, with Dr. James A. L. Mathers, he has made clinical studies on the reflex changes in the electrocardiogram of patients with hiatus hernia.

Dr. Cosgriff has continued studies on the role of ACTH and cortisone in precipitating thromboembolic disease and on the clinical evaluation of newer anticoagulant agents. He has also wtih Dr. Edgar Leifer studied a patient with a hemorrhagic diathesis due to factor V deficiency.

Professor René Wégria, with techniques making it possible to measure simultaneously coronary artery flow, cardiac output, and systemic blood pressure in the anesthetized dog, has, with Drs. Charles W. Frank, Robert S. Sioussat, and George A. Misrahy, studied the effects on coronary flow of a variety of arrythemias and chemical agents including nor-epinephrine, epinephrine, morphine, and tetraethylammonium. This group has also studied the value of a number of drugs on resuscitation from ventricular fibrillation. Dr. Richard J. Stock and Professor Gilbert M. Mudge completed a study of the variations in electrolyte metabolism in patients with congestive heart failure treated with rigid salt restriction and mercurial diuretics.

Professor Robert L. Levy, with Dr. Mathers and Professor John L. Nickerson of the Department of Physiology, has compared the effect of standardized exercise on cardiac work as determined by ballistocardiography in normals and in patients with cardiac disease. Professor Levy and Dr. Mathers, with the assistance of Professor John W. Fertig of the School of Public Health, have made a statistical analysis of patients who have had anoxemia tests in a ten-year follow-up study. Professor Levy, with Dr. John A. Wood and Dr. John H. Laragh, has made clinical studies on the clinical picture presented by patients with intraventricular thrombosis and on the prognosis in tuberculosis. Dr. John R. West has been making studies correlating pulmonary and cardicirculatory functions in patients with mitral valvular disease. With Drs. John H. McClement, Douglas Carroll, Harry A. Bliss, Professors Dickinson W. Richards and André Cournand at Bellevue Hospital and Presbyterian Hospital, Dr. West has studied the effect of cortisone and ACTH on pulmonary function in patients showing evidence of impairment of alveolar-capillary diffusion. Dr. West has continued cooperative studies with the Department of Surgery in congenital heart disease and the selection of patients with mitral disease for operation.

Professor Alvan L. Barach, with the collaboration of Drs. Gustav J. Beck

and Hylan A. Bickerman at the Goldwater Memorial Hospital and the College of Physicians and Surgeons, has developed the basic principles involved in coughing and has devised apparatus to simulate a cough. This device may prove of great importance in the management of certain patients with bulbar poliomyelitis, bronchiectasis, and possibly other disorders. This group has also analyzed the results of one hundred courses of therapy of ACTH and cortisone in patients with bronchial asthma and pulmonary emphysema.

Professors Charles A. Ragan and Ralph A. Boots have continued long-term studies on the effect of ACTH and cortisone in a group of seventy patients with rheumatoid arthritis to determine the possibilities and limitations of this type of therapy. Dr. de Guise Vaillancourt and Dr. Albert W. Grokoest have made quantitative studies of the pain threshold in patients and animals receiving cortisone. Professor Ragan, in cooperation with Professor Frank E. Stinchfield of the Department of Orthopedic Surgery, has carried on studies of the usefulness of cortisone in the management of a variety of orthopedic diseases. With Professor Joseph C. Turner and Dr. George A. Hyman, Professor Ragan has shown that ACTH ameliorates clinical scurvy and that it apparently stimulates the adrenal cortex to elaborate steroids despite depletion of vitamin C. Dr. Edward E. Fischel completed studies of quantitative measurements of complement in acute nephritis. He also, with Dr. Mojens Bjrneboe of Copenhagen, showed that cortisone does not accelerate the disappearance of passively transferred antibodies. With Dr. Frank, Dr. Fischel has participated in a cooperative study under the United States Public Health Service on the comparative effect of ACTH, cortisone, and salicylates in acute rheumatic fever.

In collaboration with Professor Samuel Graff of the Department of Biochemistry and Professor Cushman D. Haagensen of the Department of Surgery, Professor Michael Heidelberger continued study of the immunochemical specificity of the milk factor in mammary carcinoma in mice. With Professor Heidelberger, Dr. Albert N. O'Neill has undertaken the fractionation of complement at low temperature with alcohol. With Mr. Harold Markowitz, Professor Heidelberger has been studying the chemical structure of Type I pneumococcus specific polysaccharide. He has purified the polysaccharide of Type III pneumococcus, the best preparation containing only 0.05 per cent nitrogen. Dr. Derrick Rowley studied the effect of cold alcohol precipitation on the immunochemical constants of an antitoxin-type antibody. Dr. Richard J. Nelson demonstrated that cortisone has no effect on the passive sensitization of the guinea pig uterus, but does inhibit the contraction of bowel strips.

Dr. Daniel L. Larson demonstrated with quantitative immunochemical techniques that cortisone, in dosage used clinically, causes no inhibition of

the circulating antibody in man. He continued his studies on variation in antibody response in humans with different types of leukemia. He also completed a study on the occurrence of bacterial polysaccharides in the centrospinal fluid of patients with purulent meningitis. Professor Yale Kneeland continued clinical studies of antibiotics in infectious disease. With Dr. D. Geraint James and Mrs. Katherine M. Price, Professor Kneeland studied the effects of antibiotics on the growth of the virus of feline pneumonitis. With Professor A. Raymond Dochez, Mrs. Price continued studies on the chemotherapy of influenza with various aldehydes. Professor William B. Sherman, with Dr. Rosylin Barbash, established that the topical application of cortisone in allergic rhinitis is of no therapeutic benefit. With Mr. Joseph Portnoy, Professor Sherman has been studying the complement fixation of rabbit antiserum against ragweed pollen in the hope of finding an in vitro method of determining the blocking antibody for ragweed pollen resulting from repeated pollen injection.

Professor Alfred Gellhorn has continued studies on experimental cancer chemotherapy, particularly with purine and pyrimidine analogues. Studies were initiated to determine the mechanism of action of 8-azaguanine. Professor Joseph C. Turner, in addition to studies mentioned above, with Dr. Robert A. Kritzler and Mrs. Barbara M. Kritzler, described a new virus in a specific mammary carcinoma of mice. He also, with Professor Ragan, demonstrated that ACTH and cortisone induce temporary amelioration of certain types of purpura.

Professor Darling continued studies on the properties of sickle cells and Dr. Daniel C. Tosteson studied the abnormal permeability of sickle cells for sodium and potassium. With Dr. Milos G. Lota, Professor Darling now is developing apparatus for the measurement of peripheral circulation. He, together with Miss Marion J. Strauss, is carrying out follow-up studies of rehabilitation at the Institute for the Crippled and Disabled. Professor Charles A. Flood and Dr. George C. Hennig have completed a study of the value and limitations of gastroscopic observations in the diagnosis of benign and malignant lesions of the antrum of the stomach. The use of banthine in the treatment of peptic ulcer and the control of intestinal motility has been studied by Professor Flood and Dr. Michael J. Lepore and Professor Ross Golden of the Department of Radiology. Dr. Calvin H. Plimpton studied the possibility of skeletal demineralization with the chronic administration of ammonium chloride and dietary restriction. Professor Robert F. Loeb served as Co-Editor and Professor Gutman as Associate Editor of the eighth edition of Cecil's *Textbook of Medicine*. Professor William H. Sheldon has continued the collection of material for his atlases on the somatotypes of men and women. Professor George C. Daniels and his associates have continued their psychophysiological studies in a broad range of disease states

including ulcerative colitis, hypertensive vascular disease, amenorrhoea, menorrhagia, vomiting of pregnancy, and a variety of peripheral vascular disorders, particularly Raynaud's disease.

In the Chest Service and the First Medical Division at Bellevue Hospital, Professor André Cournand, with Professor Irene Ferrer, Dr. Rejane M. Harvey, and Dr. Richard T. Cathcart, has studied the circulatory dynamics of patients with large hearts which respond to digitalis. This group has continued studies of cardiodynamics in chronic pulmonary disease as well as circulatory dynamics in restrictive pericarditis. It has also continued its quantitative studies of the effects of mitral valve commissurotomy. Drs. Cathcart and William W. Field have carried out extensive studies on cardiac output as determined by the Fick principle and the Nickerson ballistocardiograph. These investigators are also developing the dye injection technique for the measurement of cardiac output. Dr. William H. Stearns and Dr. John H. McClement and Professor Marvin Kuschner of the Department of Pathology are continuing correlated studies on the physiological, therapeutic, and pathological changes resulting from streptomycin and para-aminosalicylic acid in pulmonary tuberculosis. Drs. Bettina B. Garthwaite and Henry G. Schaffield are studying the effect of viomycin in tuberculosis.

With the resignation of Professor Gutman at the Goldwater Memorial Hospital, Professor Seegal was named responsible investigator for the study of hypertension with the Kempner rice diet. Emphasis is now being placed on the lipid disturbances resulting from this diet, on attempts to assess the role of severe protein and fat restriction, and on the apparent disturbances of carbohydrate metabolism in many hypertensive patients. Professors Forrest E. Kendall, Margaret Bevans of the Department of Pathology, and Alfred Steiner, with Drs. Jack T. Davidson and Frederick T. Hatch, have continued their studies on experimental and human arteriosclerosis. At Goldwater Memorial Hospital and Presbyterian Hospital, Professor Steiner and Dr. Mathers have continued their study of serum lipid patterns in patients with coronary artery sclerosis. Dr. James G. Hilton has carried out observations on the mechanisms of ammonium chloride and mercury diuresis in normal individuals and in patients with disease of the liver. Studies on the effect of smoking on cough and respiratory function have been in progress under Professor Barach, Dr. Bickerman, and Dr. Beck. Dr. Henry Colcher, in cooperation with Dr. Franklin Hollander of Mount Sinai Hospital, has been studying the patterns of electrolyte secretion in the stomach. Professor Gutman and Dr. T'sai Fan Yu continued their studies of uric acid metabolism in gout. This work was carried out with Dr. DeWitt Stetten of the Public Health Research Institute, Inc. Professor Gutman and Dr. Yu demonstrated that Benemid is a highly efficacious uricosuric agent. These

investigators also continued studies on the mechanism of calcification of cartilage.

During the past year distinctions have come to numerous members of the Department, many of whom have been invited to lecture at medical schools throughout the nation and abroad. Among these distinctions may be included the following: Professor Dickinson W. Richards, Jr., has been in charge of a new committee of the National Research Council to evaluate "plasma expanders" for use in a widespread emergency. Professor André Cournand delivered a Harvey Society Lecture. He also addressed the International Pediatrics Congress in Zurich. Professor J. Burns Amberson was elected to the Société Française de la Tuberculose. Professor Stanley E. Bradley has been named Editor-in-Chief of the *Journal of Clinical Investigation*. Professor Alfred Gellhorn delivered the Major Sellig Lecture at Washington University. Professor John V. Taggart was guest and lecturer in the Division of Medical Sciences of Harvard University. Professor Gilbert H. Mudge was the recipient of the Joseph Mather Smith Prize. Professor Michael Heidelberger was a guest in Peru, Chile, and Brazil, where he delivered numerous lectures. He was made honorary member of the Faculty of Chemistry at the University of Chile and honorary member of a number of societies. Professor Yale Kneeland delivered the Walter Suitar Lecture at the New York Academy of Medicine and Professor Sidney C. Werner the Hare Medical Society Lecture at Jefferson Medical College. Professor Charles A. Ragan was elected Vice-President of the New York Rheumatism Association. Professor Robert F. Loeb was President of the Harvey Society and was elected to the American Philosophical Society. He received the degree of Doctor of Science from the University of Chicago and was appointed to the National Science Foundation.

OCCUPATIONAL THERAPY

Under the guidance of Miss Marjorie Fish, Director of Training Courses for Occupational Therapists, the school year opened with a total of eighty-six students (including seven men), of which thirty-three were in clinical affiliations. Of the fifty-three in residence in the School, forty-one were new admissions. Of the affiliating group, thirty-one completed the requirements of the Faculty of Medicine early in 1951, ten receiving the Bachelor of Science degree and twenty-one receiving the Certificate of Training.

The close affiliation of the College of Physicians and Surgeons with the Institute for the Crippled and Disabled has continued in a highly satisfactory manner this year. The extra space of a modest-sized office room has added to the efficiency of the unit. Further facilities have been provided for the students through additions to the technical library and to the equipment.

The former was made possible through the assistance of the Baruch Committee on Physical Medicine. Instruction of the students in the unit has been under the able direction of Miss Edith H. Brokaw, who was assisted by Mrs. Charlotte Humsey.

Clerkships have continued in the second year as an excellent teaching method. The clerkship in physical disabilities and rehabilitation conducted at the Institute for the Crippled and Disabled functioned smoothly. There were slight changes necessary in the general medical-surgical and psychiatric clerkships. Because of the depleted occupational therapy staff in the hospitals at the Medical Center at the beginning of the school year, it was necessary to augment the program elsewhere. It was, therefore, extended through permission from Dr. William F. Jacobs, Medical Superintendent of Bellevue Hospital, to general medical-surgical assignments in the occupational therapy facilities there. Under the supervision of Miss Helen Mathias, Supervisor of Occupational Therapy, the students were assigned to the In-Patient Clinic, Out-Patient Clinic, Homebound, Medical, Surgical, and Rehabilitation Services, as well as to the Pre-Vocational Clinic. The participation of Bellevue Hospital in this program proved to be highly beneficial and was appreciated.

The psychiatric clerkship assignments were enlarged to include the occupational therapy clinics in the Psychiatric Division of Bellevue Hospital, augmenting the program already established in the New York State Psychiatric Institute and Hospital. This expansion increased the limited potential of the clerkship by bringing to focus a wider variety of diagnoses and treatment situations. The visual education teaching resources have been much improved by the acquisition of new equipment—an Ampro sound projector and a small slide and film strip projector. We are deeply appreciative of the assistance from the Baruch Committee on Physical Medicine which made this possible.

Numerous conferences and exhibits of allied professional groups were made available to our students during the academic year. Noteworthy persons who have lectured to the student groups throughout the year include: Dr. Claudia Burton-Bradley, Medical Director, Spastic Center, Sydney, Australia; Lieutenant-Colonel Miriam E. Perry, Acting Chief, Women's Medical Specialist Corps, Department of the Air Force, Office of the Surgeon General, Washington, D.C.; Lieutenant-Colonel Ruth A. Robinson, Women's Medical Specialist Corps, Physical Medicine Consultants Division, Department of the Army, Office of the Surgeon General, Washington, D.C. A unique offering in connection with the Spring Session course in rehabilitation included a panel of distinguished persons: Mr. George H. Simpson, International Business Machines Corporation; Dr. Arthur S. Abramson, Chief, Physical Medicine Rehabilitation Service, Bronx Veterans Administration

Hospital; Miss Viola Jones, Rehabilitation Representative, American Mutual Liability Insurance Company.

The physical medicine residents have been part of our teaching program. Occupational therapy for four residents has been increased in the number of hours offered and has included theoretical, observational, and clinical instruction given by members of the occupational therapy administrative and teaching staff.

We have welcomed several new instructors to our teaching program, and we appreciate their services: Dr. Charles W. Findlay, Jr., Department of Surgery; Dr. Frederick J. Knocke, Department of Orthopedic Surgery; Dr. Chi-Chen Wang, Department of Physiology; Mr. John S. Leary, Department of Fine and Industrial Arts, Teachers College.

Two new clinical training affiliations have been added: Bonnie Burn Tuberculosis Sanatorium, Scotch Plains, New Jersey, and the United States Army Hospitals. This brings these teaching facilities to a total of twenty-six. A close working relationship has continued between the School and the clinical training directors. The Regional Occupational Therapy Conference held in April brought together the directors of the six eastern schools and the training directors of all teaching hospitals in the eastern area. We wish to take this opportunity to express our appreciation for the fine cooperation in the teaching and training program which all of these persons and institutions have extended to us.

Continuous demand for qualified therapists still far exceeds the number available. Considerable staff time is devoted to requests for advisement and consultation relative to the establishment and/or expansion of hospital departments. We carry a listing of 320 openings in the United States, Alaska, India, Hawaii, and Puerto Rico. The 1951 graduates are in directorships and assistant positions in orthopedics, cerebral palsy, psychiatry, general medicine and surgery, tuberculosis, chronic diseases, pediatrics, and in work with the blind.

This year marks the tenth year of the establishment of the occupational therapy training program in the University. It has seemed appropriate to undertake a ten-year survey of all our 240 graduates located and practicing in 31 states, Siam, Puerto Rico, and France. This survey includes a questionnaire sent to all graduates, the results of which, we trust, will indicate that we are fulfilling our professional obligations and contributing a valuable part to the development of the profession of occupational therapy. The results of the survey will be available early in the coming academic year.

Distinguished visitors continue to come here, seeking information in the educational field as related to occupational therapy. Among those received by us this year are: Dr. Grace Cuthbert, Director, Maternal and Child Health,

Sydney, Australia; Dr. Alan B. Lilley, Chairman, Hospitals Commission, Sydney, Australia; Dr. F. Koike, Children's Bureau, Ministry of Welfare, Tokyo, Japan; Dr. Chien Siriyananda, The Mental Hospital, Bangkok, Thailand; Dr. Alan Stoler, Chief Psychiatrist, Repatriation Commission and Representative, World Health Organization, Melbourne, Australia; Dr. Hefson Cavalcanti, Rio de Janeiro, Brazil; Mr. K. Paul, Delhi School of Social Work, Delhi, India; Mr. Yuichi Nakamura, Japan School of Social Work, Tokyo, Japan; Miss Kerstin Helgegren, Physical Education Director, Sahlgrenska Hospital, Gothenburg, Sweden; Miss Agnetta Wedell-Wedellsborg, Municipal Hospital, Copenhagen, Denmark.

Staff members have been active in professional organizations, committee work, and in lecturing to lay and professional groups.

PHYSICAL THERAPY

The program in physical therapy has continued under Miss Floy Pinkerton, Director of Training Courses for Physical Therapists. During the academic year a total of 52 students were enrolled. The seniors (16) will complete their final month of clinical practice during the month of June at the New York State Rehabilitation Hospital, West Haverstraw, New York. The advanced standing students (15) are scheduled for three months of clinical practice, each student attending three different installations. By the end of August we plan to graduate a total of 31 regular students and one special student. Each junior is scheduled for two months at one of the many clinical installations, where he will have the experience of a well-organized clerkship.

The seven courses—kinesiology, massage, therapeutic exercise, relaxation, orthopedics, rehabilitation, and recreation—which were taught at the Institute for the Crippled and Disabled in 1949–1950 were continued. Efforts are being made to increase the clinical facilities, which now number fourteen institutions outside of the Medical Center. The number of installations must be increased if we are to succeed in our plan to broaden the experience of the degree students by arranging clerkships for them at the end of their junior year. Three new ones have been added in this area: Grace-New Haven Community Hospital, New Haven, Connecticut; Hartford Hospital, Hartford, Connecticut; and Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn, New York.

Recognizing the trend for the need of more physical therapists in rural areas, we have arranged an affiliation with the Morris Memorial Hospital for Crippled Children, Milton, West Virginia, in which students will work under supervision both at the hospital and in the homes in the surrounding area. We trust that this is a step toward interesting physical therapists in rural and suburban service.

Two new special lecturers have been obtained this year: Margaret M.

Hebert, Coordinating Physical Therapist, Neurological Institute, to teach bandaging and hydrotherapy and supervise the laboratory work in electrotherapy, therapeutic exercise, and radiation; and Dr. Jacob Meislin, Chief, Physical Medicine and Rehabilitation, Franklin Delano Roosevelt Hospital, Montrose, New York, to give the lectures on physical medicine in psychiatry.

All of our students are benefitting from the use of the main lounge at Bard Hall. While their schedule does not allow them to use the lounge often, it is convenient for them to have a place to meet their friends and to wait for lunch or appointments. During the year they have had social activities and class meetings at both Maxwell Hall and Bard Hall.

We are glad to report the recognition that our program has received by professional associations both in this country and abroad. Throughout the year we have had requests for visitors to observe our organization at the Institute for the Crippled and Disabled and at the Medical Center and to discuss educational programs and problems as well as professional trends. This year our foreign visitors came from Sweden, Norway, Denmark, Holland, Israel, and England.

DEPARTMENT OF NEUROLOGY

Professor H. Houston Merritt, Executive Officer

The teaching activities of the Department of Neurology have continued at their usual high level. Various members of the staff have assisted the medical science department in the instruction of the first- and second-year students in the fundamentals of anatomy, physiology, and pathology of the nervous system. The introductory course in neurology which is given to the second-year students was conducted by Professors Carmine T. Vicale and Theodore J. C. von Storch. The emphasis in this course is placed on the correlation of anatomy and physiology with abnormalities in function which develop in patients with disease of the central nervous system. Methods of examination of the patient are stressed in order to prepare the students for the clinical work of the third and fourth years. The third-year elective course in neurology continues to be popular, approximately one-half of the class electing to take this course.

The activities in the laboratories have continued to expand. A small amount of additional laboratory space has been obtained as a result of the additions to the medical school, but the workers in our Department are still greatly cramped for space, and it is not possible to accept many graduate students and fellows who seek opportunity to work in the laboratories.

During the current year three books were prepared for publication by Professor Fred A. Mettler. These were *Psychosurgical Problems*, to be pub-

lished by Blakiston shortly, *Transactions of the First Research Study Group on Psychosurgery,* published by the Government Printing Office, and *Transactions of the Second Research Study Group on Psychosurgery,* to be published by the Government Printing Office in the near future. Professor Henry A. Riley has continued the revision of Tilney and Riley's *Form and Functions of the Human Nervous System,* and it is expected that this will be ready for publication in the course of next year.

Data on the third and last Greystone Project became available early in the year, and Dr. C. Archie Crandell of Greystone Park Hospital and Professor John R. Wittenborn of Yale University School of Medicine have developed this data along two different lines. Dr. Crandell has investigated the factors of deterioration and regression with regard to prognosis following psychosurgery, and Professor Wittenborn has developed quantitative methods for the study of psychological changes, especially as these may occur following psychosurgery. Dr. Wardell Pomeroy of the University of Indiana has been currently engaged in the study of the sex behavior of patients receiving psychosurgery, and this material is now being developed in his doctoral dissertation. Dr. Malcolm B. Carpenter has continued work on abnormal movements in primates and with Dr. John Whittier has been occupied with the study of space controlled lesions in the nervous system. Dr. Carpenter is now currently active in connection with the Nerve Study Project of St. Alban's Hospital, and Dr. Whittier is engaged in cinematographic analysis of abnormal movement. Mr. Stanley Crain has been studying the effect of quaternary ammonium basis on nerve conduction. Mr. Crain has also been engaged in the investigation of the appearance of "spontaneous" potentials in the brain of the newborn rat. With Professor Margaret R. Murray of the Department of Surgery, he is beginning the study of the electrical phenomena of nerve cells in vitro.

Dr. Sidney Cohen, Fellow of the United States Public Health Service, has completed research on the spinal afferent pathways to the thalamus and on the nature and the localization of activity so induced in the thalamus. Dr. Cohen found that the earliest and largest responses in the posterior ventral nucleus of the thalamus result principally from spinal activity reaching the medulla via the dorsal columns. Thence, both crossed and uncrossed relays activate the thalamus after a delay of about 2 milliseconds. Localization in the nucleus is very gross, and given regions of the nucleus can be activated by afferent stimuli from nerves of the hind-limb, fore-limb, and face. Dr. Cohen is also carrying on work on the mechanism of inhibition of motoneurons by the descending spinal inhibitory systems.

Dr. Howard Krieger, United States Public Health Service Fellow, is engaged in a study of synaptic connections using the nucleus of Clarke's column. Professors Harry Grundfest and Fred Mettler, together with Mr.

Christian Hovde, are making a study of the connections and physiological properties of the caudate nucleus. This study combines electrophysiological techniques with those previously used in neurophysiological studies. Professor Grundfest has completed an analysis of the spino-olivary system which was discovered by electrophysiological techniques.

Professors Grundfest and David D. N. Nachmansohn, while working at the Marine Biological Laboratories in Woods Hole, Massachusetts, in the summer of 1950, studied the permeability of nerve fibers (in giant axons of the squid) under various conditions by using radioactive tracer ions. This work is aided by a grant from the Atomic Energy Commission.

Professors Grundfest and Nachmansohn, working jointly with Professor Isidore Snapper of Mount Sinai Hospital, are conducting experiments on the effects of some curare-like anticholinesterasic compounds on the electrical activity of nerves.

Professor Grundfest has continued his studies on the effects of injury to the peripheral nerves in men with the collaboration of Drs. Ernst Herz, Joseph Moldaver, and Melvin Yahr. This work is conducted at the Neurological Institute with the aid of a grant from the Veterans Administration. In addition to the follow-up studies of patients from World War II, approximately 120 fresh cases resulting from the Korean conflict are now under investigation. Recommendations have been made to the Armed Forces in regard to the organization of peripheral nerve injury diagnostic and therapeutic work.

Professor Grundfest has designed a digital plethysmograph which is being used not only in special research of the Peripheral Nerve Study Center but also in attacks on psychiatric and psychosomatic problems. With Dr. Frederic T. Zimmerman and Dr. Bessie Burgemeister, an examination is being made of possible correlations between verbal reactions to the Rorschach test cards and the digital plethysmogram.

Digital plethysmography is now also being used by Dr. Harold Sherman and Dr. Joseph E. Fiasconaro of the Department of Dental and Oral Surgery to evaluate psychogenic factors in dental pain and in evaluation of the relief of pain by various drugs.

For the needs of the research program the instrumentation laboratory has developed and constructed a number of electronic devices, with the assistance of electronic engineers.

The Division of Neurochemistry under the direction of Professor Nachmansohn continued its studies on enzymes and intermediate chemical reactions of nerve tissue in relation to nerve function. The work is aided by grants from the United States Public Helath Service, the National Heart Institute, the Surgeon General of the Army, and the Atomic Energy Commission.

Professor Nachmansohn and his associates are particularly interested in the analysis of the elementary processes of the conduction of the nerve impulse and the various chemical and physical factors affecting them. Studies on the active atomic groups in the surface of the enzyme acetylcholinesterase, which is essential in the primary event generating electric currents, have been continued by Dr. Irwin B. Wilson. The work is of general interest to enzyme chemists, since it proposes the finer mechanism of an enzymatic action.

Several facts of great physiological and pathological interest emerged from these studies. It could be demonstrated that alkyl phospates, which are the most powerful war gases known so far and which act by inhibition of acetylcholinesterase, do not destroy the enzyme but form a complex which may be reversed. This is in contrast to the generally accepted view of the completely irreversible nature of this reaction. The implications of this discovery for chemical warfare are obvious. Another important result of these studies is the demonstration that curare-like compounds do not block neuromuscular transmission, as has been believed for a century, but, under appropriate conditions, may block axonal conduction.

Dr. Wilson, assisted by Dr. Saul R. Korey and Miss Ruth Berman, also investigated the mechanism of the acetylation of choline. Considerable progress in the understanding of the process of acetylation was achieved. This reaction is of great importance in the building process of many organic molecules essential in living cells.

A new and interesting method for the purification of acetylcholinesterase was devised by Dr. Sumner Levine, using the method of alcohol precipitation of proteins at –8° C, as developed by a group at Harvard. It is hoped that these studies will lead to the isolation and better understanding of the protein involved in conduction.

Dr. Korey showed that dilantin and mesantoin, two of the most important drugs used against convulsive seizures, do not affect normal axons but depress the excitability of hyperirritable fibers.

Professor Nachmansohn was invited during the summer to two international symposia in Europe. One was on neurophysiology, held in Stockholm, Sweden, the other on the biochemistry of muscle, organized by UNESCO and held at the Abbaye Royaumont, France. During his stay in Europe he lectured at the Instituto Superiore di Sanità in Rome, Italy. He also was invited to lecture at a symposium in Oak Ridge, organized by the Atomic Energy Commission.

Professor Nachmansohn is the editor of the *Transactions* of the Josiah Macy, Jr., Foundation Conferences on the Nerve Impulse. The *Transactions* of the First Conference appeared in February. Those of the Second Conference are in preparation.

Under grants from the United States Public Health Service and the William J. Matheson Commission, Professor Elvin A. Kabat, Professor Abner Wolf, and Miss Ada E. Bezer have continued their studies on acute disseminated encephalomyelitis produced in rhesus monkeys by the injection of brain emulsions with adjuvants. Large doses of cortisone were shown to prevent the occurrence of acute disseminated encephalomyelitis not through any action on the disease process but as a consequence of the inhibiting effects of cortisone on local granuloma formation at the inoculation sites. An extensive immunochemical study of the cerebrospinal fluid proteins in this experimental disease has been carried out by Professors Kabat and Wolf and with Miss Ada E. Bezer and Miss Jean P. Murray. Dr. Melvin D. Yahr and Professor Kabat are analyzing the results of the immunochemical globulin determinations being used at the Neurological Institute. Immunochemical studies on gamma globulin specificity are continuing in collaboration with Miss Alice Rabiner.

Immunochemical studies on the blood group A and on B and O substances have been continued in Professor Kabat's laboratory in collaboration with Dr. Sam M. Beiser, Dr. Calderon Howe, a National Research Council Fellow, Dr. Helen Van Vunakis, and Miss Deborah Berg. Dr. Sidney Leskowitz recently joined this group. Mr. Joseph M. Schor has joined Professor Kabat's group as a graduate student in bacteriology. Dr. Beiser completed his Ph.D. dissertation on bovine blood group substances and was awarded a National Research Council Fellowship to study immunochemical aspects of bacterial genetics with Dr. Bernard D. Davis at Cornell University Medical College. Professor Howe is attempting to isolate blood group substances from erythrocytes. Dr. Van Vunakis demonstrated that six amino acids are liberated by mild acid hydrolysis of blood group substances, a finding which may lead to an understanding of the immunological specificity of these substances. Dr. Beiser and Miss Berg are studying specificity relationships among horse, hog, and human blood group substances and relationships of the so-called natural isoagglutinins. Professor Kabat delivered a Harvey Lecture in May, 1951, entitled "Immunochemistry of the Blood Group Substances" in which he summarized the work of the laboratory on this subject since 1945.

Professor Kabat was elected an honorary member of the Société Française D'Allergie and was appointed a member of the Subcommittee on Shock of the National Research Council.

Professors Wolf and David Cowen and Dr. Fred C. Boykin have continued to work on a long-term evaluation of the brain tumor material of the Neurological Institute.

Under a United States Public Health Service grant work was continued by Professors Cowen and Wolf on the effect of intrauterine infections on

the fetal nervous system. A series of papers concerned with the pathology and pathogenesis of experimental congenital toxoplasmosis in the mouse was completed and published.

In collaboration with Professor Kabat, work on allergic encephalitis in the monkey is being continued.

Professor Wolf, in collaboration with Dr. Irwin Feigin and Dr. Estelle Geller of the Central Research Division of the Bronx Veterans Administration Hospital, is studying the effects of cortisone on the healing of brain wounds. In the course of studies of regeneration in the central nervous system, acid and alkaline phosphatase activity in healing wounds of the peripheral nerve is being compared with that in healing wounds of the spinal cord.

Professor Paul F. A. Hoefer has continued to carry a heavy clinical load in the electroencephalographic laboratories at the Neurological Institute. Clinical and electrophysiological studies which have been published by Professor Hoefer and his associates include: A study of the electrocorticogram and direct current potentials of the brain, in collaboration with Mr. Robert L. Schoenfeld and Dr. Eli S. Goldensohn, United States Public Health Fellow on leave of absence from the University of Colorado; electroencephalographic changes during and after encephalitis, with Dr. Gilbert A. Glaser, United States Public Health Service Fellow; electroencephalographic findings in cerebral vascular lesions, with Dr. Isidore S. Zfass of Richmond, Virginia; effects of pituitary adrenocorticotrophic hormone therapy on the electroencephalogram, with Dr. Glaser; paroxysmal abdominal pain, an epileptic equivalent, with Dr. Sidney Cohen, United States Public Health Service Fellow, and Dr. David McL. Greeley of the Department of Pediatrics; and correlation of clinical findings on patients with abscesses of the brain, with Dr. Dewey Ziegler.

Numerous clinical studies have been conducted by various members of the Department at the Neurological Institute. Dr. Glaser has studied the effect of the pituitary adrenocorticotrophic hormone on the clinical course of various diseases of the nervous system. It was found that administration of this hormone is accompanied by an amelioration of some of the symptoms in patients with multiple sclerosis. It is not thought that ACTH has any curative effect on the disease process but that the beneficial effects may be due to a modification of the response of the nervous system to the disease. Cortisone is now being administered for prolonged periods to a number of patients with multiple sclerosis in order to determine whether the establishment of the state of hyperadrenalism will prevent the development of relapses.

It was found that ACTH had no appreciable effect on the symptoms of patients with various other diseases of the nervous system, including amyotrophic lateral sclerosis, muscular dystrophy, *paralysis agitans,* and epilepsy.

The untoward side-effect of ACTH therapy is the development of various abnormal mental states, including frank psychoses. These are being studied by Dr. Glaser. It has been found that these untoward reactions occur in only a small percentage of the patients who are treated with the hormone.

Drs. Kate Constable and Lewis J. Doshay continue their studies of new compounds in the treatment of patients with *paralysis agitans*. They have found that the administration of the various antihistamines in combination with artane or the alkaloids of belladonna have some beneficial effects.

The convulsive disorders continue to be one of the main interests of the Department. Various new compounds have been tested for their therapeutic effect in animals by Professor Sidney Carter and Drs. Daniel Sciarra, Yahr, and Zimmerman. A small number of these compounds have been given a clinical trial. One compound has been found which is effective in the treatment of patients with petit mal and which does not have the toxic properties of drugs now in common use. A number of new compounds are now being tested for their value in the treatment of patients with grand mal and psychomotor seizures. These studies have been aided by grants from the Benjamin Lazrus Foundation, Inc., Parke, Davis and Company, and Smith, Kline & French Laboratories.

A new clinic for children with convulsive disorders has been opened in the Vanderbilt Clinic. This clinic is conducted in conjunction with the Department of Pediatrics and offers complete pediatric, neurologic, and psychiatric care for children with convulsive disorders. Closely coordinated with this clinic, a research laboratory has been established in the Neurological Institute with the aid of a grant from the Society for the Aid of Crippled Children. The equipment of this laboratory includes an eight channel recording instrument for electroencephalography, a frequency analyzer, and a stroboscope which will be used to study the physiology of convulsive seizures. The clinic and laboratory were under the direction of Dr. William Caveness until he was called into the armed forces in December. The personnel of the project includes Drs. Glaser, Zira DeFries, Sue E. Browder, and Leon Golub.

The Department at Montefiore Hospital, under Professor von Storch, continues to carry a large share of the teaching load for the second- and third-year students. With the aid of a grant from the National Multiple Sclerosis Society, Professor von Storch and Dr. Tiffany Lawyer have organized a clinic for the study of patients with multiple sclerosis. Etiology of the disease is being studied and the effects of various forms of treatment have been tested. It was found that vitamin B_{12} in large doses had no effect on the course of the disease.

Dr. Arnold Friedman is conducting a clinic at Montefiore Hospital for patients with headaches. Physiological and psychological aspects of the

problem are being studied intensively and new forms of therapy are being tested.

DEPARTMENT OF NEUROLOGICAL SURGERY

Professor J. Lawrence Pool, Executive Officer

During the academic year all members of the Department have been active in teaching and some in research.

While the bulk of teaching is devoted to the resident staff and fellows, a course of lectures on neurosurgical subjects is presented each year to the fourth-year medical students. In addition, a number of lectures are given the neurological nursing staff and other groups at the Medical Center.

Dr. Lester A. Mount has continued his studies on the cerebral circulation and the treatment of intracranial aneurysms and other vascular anomalies of the brain. Dr. Charles E. Brackett, Jr., former research fellow and now Chief Resident, has been an active participant in this work and has collaborated on a recently published paper on the subject presented before the American College of Surgeons in October, 1950. Through the generosity of the Aneurysm Gift, Dr. Robert R. J. Strobos has been made a visiting research fellow to help in the work on this problem. Dr. Edward B. Schlesinger has pursued his careful investigations regarding the uptake of radioactive substances, such as P_{32}, by normal brain tissue and various types of brain tumors. His work is also of importance with regard to the circulation of the brain and the output of cerebrospinal fluid. Dr. Joseph Ransohoff has been active in the field of psychosurgery and has paid particular attention to the function and mapping of hitherto uncharted areas of the frontal and temporal cortex of the human brain.

Professor J. Lawrence Pool has maintained his interest in the neurosurgical treatment of various types of otherwise intractable mental illness by frontal and temporal lobe surgery. This work, now continued over a span of nearly five years, has led to a clearer concept of the value of psychosurgery and to a better ability to select patients for a given type of brain operation. Professor's Pool's work could not have been carried out without the able cooperation and diligence of Dr. Murray Glusman and Dr. Norman Sloane and the guidance of Professor Harry Grundfest of the Department of Neurology.

A study of malignant brain tumors in children and adults has been initiated, with Professor Margaret R. Murray of the Department of Surgery as the active investigator. In her tissue culture work Professor Murray has found that in certain concentrations a chemical substance, guanazola, arrests the growth of tumor cells (glioblastoma multiforme). Thanks are due to

the John Gunther, Jr., Memorial Fund and the Brain Tumor Research Fund for making possible much of the work in this promising field. Dr. Frederick Boykin is conducting associated experiments with artificially produced brain tumors in mice and is studying the effects of guanazola on the rabbit brain.

Professor Pool has participated with Professor Ernest H. Wood, Jr., of the Department of Radiology in a study which indicates the beneficial effects of X-ray therapy on pure cultures (spinal implants) of glioblastoma multiforme. In the laboratory Professor Pool has been active in attempting to develop a technique of blood vessel surgery to treat intracranial aneurysms by a by-passing method. He has also initiated a project designed to study cerebral circulation by means of microphotographs.

Members of the house staff have been encouraged in various investigative endeavors. Dr. Charles E. Brackett, Jr., has participated in a paper on cerebral circulation. Dr. Charles A. Carton has written a treatise on torula infections of the central nervous system and has recently collaborated in a basic study concerning the activation of latent virus infections of the central nervous system. Dr. John Jacobs has completed the translation of a monograph by Ramón y Cajal from Spanish into English.

In May, 1951, the degree of Doctor Honoris Causa was awarded to Professor John E. Scarff by the Universidade do Rio Grande do Sul at Pôrto Alegre, Brazil, for his work on hydrocephalus.

In November, 1950, an informal and highly instructive dissertation on the treatment of intracranial aneurysms was given by Sir Geoffrey Jefferson of Manchester, England. At the Neurological Institute Alumni meeting in December, 1950, Professor Percival Bailey of the University of Illinois discussed papers presented by members of the Department.

DEPARTMENT OF NURSING

Professor Eleanor Lee, Acting Executive Officer

The resignation of Professor Margaret E. Conrad is reported with profound regret. Under her able leadership the Department of Nursing has made notable progress. Miss Conrad was made Professor of Nursing in 1935 and was made the first Executive Officer of the Department in 1937. The success of the whole development is a monument to her vision, leadership, and dynamic energy.

Miss Eleanor Lee, Assistant Professor of Nursing, was designated Acting Executive Officer of the Department beginning September 1, 1950. Her familiarity with the broad educational program of the Department and her active participation in the development of the educational plan insures a

continuance of the Department along the general lines that have been evolved since 1937.

Each year the number of degree candidates has been increasing. The current registration indicates that 206 of the 306 students are candidates for the degree. Eighty of the 113 students in the first-year class are degree candidates. The class of 1951 numbered 97 students, of whom 64 were degree candidates from 44 universities and colleges.

The withdrawal rate of 10 per cent for this class is far below the average and is evidence of the effective selection by the Admissions Committee of the Department and also of the high quality of candidates applying.

At the Columbia Commencement on June seventh, 56 graduates of the nursing program received the Bachelor of Science degree. Diplomas were distributed by Dean Willard C. Rappleye at the Women's Faculty Club after which a reception was given by the staff of the Department of Nursing for the graduates and their guests.

It is gratifying to report an increase in scholarship aid, but the number of well-qualified students needing assistance is also increasing. During the year 23 University scholarships were awarded. The Dean Sage Memorial Scholarship was awarded to Miss Marjorie N. Porter, Class of 1953. This is the fifth award of the scholarship which has meant so much to the program of the Department.

Two scholarships of $200 each were awarded by the Florists' Telegraph Delivery Association, Inc., and eleven were awarded by the Alumnae Association. Two new scholarships are the Patricia Green Smith Scholarship and The Richard Walsh Scholarship. The former is in memory of Mrs. Martin DeForest Smith, Jr., and the latter was created by Miss Madeleine E. Walsh. The Greer Scholarship created by Mrs. Sidney B. Mathews has been awarded for the first time to a degree candidate in the class of 1954.

The appointments of Miss Marion E. Cleveland as Assistant Professor of Nursing, assigned to medical and surgical nursing, and Miss Delphine Wilde as Assistant Professor of Nursing, assigned to orthopedic nursing, has further strengthened the teaching program in these two divisions. Miss Gladys McGregor was appointed Instructor in Nursing and assigned to pediatrics. She is a graduate of Emory University School of Nursing with which we have had an affiliation in pediatric nursing since 1947.

Miss Margaret Hogan was appointed Instructor in Nursing to assist in new research in natural childbirth problems in the Department of Obstetrics and Gynecology. She has had an excellent background of training and comes to us from the Maternity Center Association of New York City. She was formerly supervisor at the Colley Dickinson Hospital.

It is with regret that we report the resignation of Miss Helen C. Goodale, Assistant Professor of Nursing, Miss Dorothy Rogers, Assistant Professor of Nursing, and Miss Edna L. Danielson, Instructor in Nursing.

The over-all curriculum has been revised in order to place greater emphasis on medical and surgical nursing as the core of instruction. The integrated program in medical and surgical nursing and related subjects greatly strengthens the plan of instruction for all classes and has been more than favorably received by faculty and students. Other changes in the instructional plan include strengthening the neurological and orthopedic teaching and the psychiatric teaching at the New York State Psychiatric Institute and Hospital.

The death of Dr. B. Wallace Hamilton at the Willard Parker Hospital was a great loss since he supervised and conducted an excellent plan of teaching of communicable disease nursing during the last twenty-one years.

The Out-Patient Nursing Service continues to provide unique and valuable experience in public health education for nursing students. During the past year 103 students made 2,914 home visits. Important observation exercises were also worked out with the Visiting Nurse Service of New York, to whom we are very grateful for their cooperation and help.

Ninety-one graduates of the Department took the new type of licensing examinations instituted in October, 1950, in New York State. Forty-four per cent of the graduates taking this examination received 90 per cent or over in the average of the six examinations.

As of June, 1951, 698 students from 23 affiliated schools of nursing have completed the program of instruction and experience offered to the affiliated schools of nursing. This represents a great contribution to nursing education in those schools.

Members of the teaching staff have continued to participate actively in many national and local committees and conferences in regard to nursing education. The influence of the Department and its staff is increasing constantly and is a reflection of the quality of leadership and personnel in the Department. Similarly our student groups are taking part in numerous state and national activities in the field of nursing; this speaks well for the type of leadership which our Department is supplying. It is very gratifying to see this type of activity and constructive planning by the oncoming generation of nurses.

The Anna C. Maxwell Fellowship was established in March, 1951, on the centennial celebration of Miss Maxwell's birth. The Alumnae Association is endeavoring to raise funds for the fellowship to enable nurses from abroad to study in America and to take graduate courses at Columbia University while living in Anna C. Maxwell Hall. This fellowship will be included in the program of the International Council of Nurses and will be cleared through its London headquarters.

We have been very happy to have prominent leaders in nursing from various parts of the world visit us during the year. The stimulation and friendly exchange of experience and knowledge regarding nursing prob-

lems throughout Europe and Asia have been most interesting to our own staff. Those of our group who have gone abroad have received an equally warm welcome.

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Professor Howard C. Taylor, Jr., Executive Officer

The Department spent much of the last twelve months in preparation for the many changes anticipated during the coming year. Plans were worked out for the utilization of the additional laboratory facilities being made available, and part of this space was actually occupied. Clinical work began in the Francis Delafield Hospital, although only about one-fifth of the beds eventually planned for gynecologic cancer were in use at the time of the writing of this report. Finally, the labor and delivery rooms in the Presbyterian Hospital underwent extensive structural alterations, the new facilities becoming available only toward the end of June, 1951.

The clinical staff has remained relatively unchanged during the year. Dr. Bryon Butler and Dr. Dean Grandin, both former members of the house staff, were appointed as Instructor and Assistant respectively. There were also five nominations for promotion: Dr. Charles L. Buxton to Professor of Clinical Obstetrics and Gynecology; Dr. Saul B. Gusberg and Dr. Charles M. Steer to the rank of Assistant Professor of Clinical Obstetrics and Gynecology; and Dr. Equinn W. Munnell and Dr. Clinton P. O'Connell to the rank of Associate.

In the laboratory divisions of the Department the changes were somewhat more fundamental. Dr. Samuel Graff, for a long time the biochemist for the Department, transferred his work to the Francis Delafield Hospital and was replaced by Dr. Seymour Lieberman. Dr. Lieberman, as Assistant Professor of Biochemistry assigned to the Department of Obstetrics and Gynecology, comes to the Department with a distinguished record of research in steroid chemistry, a field whose techniques are particularly needed in the study of the problems of cancer and of the physiology of the ovarian cycle and of pregnancy. Professor Lieberman has already assembled a team of skilled assistants, including Dr. Sylvia Teich. This group promises to produce valuable work both in the fundamental biochemistry of the steroids and in its application to many clinical problems. In the laboratory supervised by Professor Gray Twombly, Dr. Erwin F. Schoenewaldt has been replaced by Dr. Mortimer Levitz.

The Department has had with it during the year two visiting fellows, namely, Dr. George C. Duperroy of the University of Louvain who holds a fellowship for study in an American university from the Belgian American

Educational Foundation, Inc., and Dr. Benjamin de A. Passos, of Paraná, Brazil, who holds a fellowship from the Federal Security Agency under the Buenos Aires Convention. Besides these two fellows who have been in the Department for a considerable length of time, there have been visitors for varying periods of time from a total of twenty countries. Visiting lecturers in the Department have included Dr. George Papanicolaou, Professor of Anatomy at Cornell University Medical College, Dr. Victor Marshall, Professor of Urology at Cornell University Medical College, and Dr. Leon Chesley, Biochemist to the Margaret Hague Maternity Hospital.

The program of instruction in obstetrics and gynecology has remained in substance unchanged. Particular effort has been made, however, to improve the organization of the small discussion groups attended daily by the fourth-year students during their two months of clinical clerkship. These discussion groups are now divided in order to cover essentially the entire field of obstetrics and gynecology and to give a framework of didactic teaching to the clinical impressions and experience being derived from the simultaneous work in the wards and clinics. It is felt, however, that teaching in obstetrics and gynecology suffers somewhat from the late introduction of the students to the subject, there being no reference to it in the curriculum until the third year, and then only by a series of theoretical lectures. The clinical work of the Department has been somewhat handicapped during the last year and a half by the necessary closing of a certain number of beds during the reconstruction in the Presbyterian Hospital. In April, 1951, however, these beds were restored to use and the clinical care of the patients now progresses with the same number of in-patients as before and with greatly improved facilities.

During February the Francis Delafield Hospital opened with its allocation of thirty-nine beds to the gynecological division. Although an average of only ten beds have been available for gynecological cases up until this time, the great value of these beds to the teaching and research program in gynecology can already be envisaged. It is hoped that the gynecologic service at the Delafield Hospital will be operated in close correlation with the departmental laboratories in the Medical School and with the gynecologic wards in the Presbyterian Hospital. In this respect it should be noted that the number of beds available in the Presbyterian Hospital for gynecology, thirty-five in number, gives a relatively small service, and, further, that there are no closely affiliated gynecologic services in other hospitals of the city to provide added surgical experience in gynecology. This situation acquires additional significance in view of criticisms current throughout the country that many men practicing gynecology and obstetrics are insufficiently trained in the fundamentals of surgery. For these reasons the addition of nearly forty beds for gynecologic surgery in the Delafield Hospital promises to be an

enormous asset to the residency training program of the Department and, indeed, makes its facilities in many ways almost unique.

The research program of the Department is also in a state of transition. Laboratory area has been assigned to it on the fifteenth floor of the newly constructed medical school space. To this area has been assigned Professor Lieberman, working on the fundamental chemical problems of the steroids, and Professor Gray Twombly, who is concerned with the physiology of the routes of excretion of the steroids as studied by radioactively tagged steroid hormones. Both Professors Lieberman and Twombly have also been assigned small laboratories in the Delafield Hospital to make it possible to extend the study of their special problems to the wards there.

On the sixteenth floor of the College, adjacent to the wards of the Department in the Presbyterian Hospital, laboratory space is also being made available to this Department. Transfer of departmental activities, already under way in places in the College, to this area will be made during the course of the summer. In this area there will be housed the pathological laboratory for the Department, biological laboratories for the study of the hormones of the anterior pituitary, the ovary, and the placenta, and facilities for the investigation of such problems as the electrophysiology of the uterus, the blood circulation of the reproductive organs, the physiology of ovulation and the menstrual cycle, vaginal cytology and methods of early detection of cancer of the uterus, physiologic studies of water and electrolyte distribution in normal pregnancy and toxemia, and other related subjects.

Plans are also taking shape for obtaining organized support of research in this general field by the development of the Sloane Institute for Research in Human Reproduction. It is hoped that the presentation of a carefully planned program of research will focus the attention of the public and of interested foundations on the fundamental character of the medical problems incidental to the reproductive process and on the necessity of expanding research in this field. The formation of such an institute has been approved by the University Council and the Trustees of the University and a Coordinating Committee of the Institute set up. The latter consists of Professors Rustin McIntosh of the Department of Pediatrics, H. Houston Merritt of the Department of Neurology, Earl T. Engle of the Department of Anatomy, D. Anthony D'Esopo, Charles L. Buxton, Howard C. Taylor, and the Dean of the Faculty of Medicine.

The current research of the Department can best be described under six special headings. The general area of fertility and conception has been under the particular direction of Professors Engle and Buxton. Professor Buxton has published papers on the use of ovarian transplants in hormonal replacement therapy and, with Professor Engle, has written on the correlation between the basal body temperature and the morphologic changes in the ovary

and the endometrium. Professor Buxton is also continuing his work on the relationship of thyroid therapy to menstrual disturbances and on the role of the bacteriology on the cervix in the diagnosis and treatment of sterility. Dr. Landrum B. Shettles, during the last year a senior resident but now appointed an Associate in the Department, is continuing, in collaboration with Professor Zacharias Dische of the Department of Biochemistry, his fundamental biochemical studies on the chemistry of the cervical mucus. Professor Engle has been interested in the cytochemical constituents of the human ovary with particular regard to lipids and cholesterol and to the protein content and electrophoretic patterns of the fluid content of various cyst types. Dr. Charles H. Duncan of the Department of Medicine has been continuing with Professor Taylor his studies of the blood flow in the reproductive organs and the relation of changes in blood flow to various types of stress and emotional factors.

With regard to the physiology of pregnancy and the pathologic physiology of toxemia, Dr. Joseph W. Jailer has continued his studies on the so-called "hyperadrenalism of pregnancy." He has been particularly interested in the attempted isolation of adrenal-like hormones from the placenta, but has found that the administration of ACTH and cortisone to normal and toxemic pregnant patients produces no detectable change in their clinical course. Professor Taylor and Dr. David B. Moore are carrying out investigations on the distribution of fluid and electrolytes in various tissue spaces of the body during normal pregnancy and in toxemia of pregnancy.

With regard to the physiology and conduct of labor, work continues under the direction of Professor Charles M. Steer with the electrohysterograph. Slightly more than five hundred cases have been analyzed with this instrument, and the types of curves correlated with normal and abnormal labor are gradually being recognized. The work on the study of labor has been greatly assisted by Professor Virginia Apgar of the Department of Surgery, assigned to the important problem of analgesia and anesthesia in obstetrics. This promises to develop into an important investigation of the causes and management of anoxia of the infant just before and after delivery. Professor Howard C. Moloy, with Professor Steer, is continuing his work on the development of precision methods of X-ray pelvimetry. Professor Moloy has perfected a new model of the Caldwell-Moloy precision stereoscope and is publishing a small monograph on the entire subject of X-ray pelvimetry.

With regard to the newborn, Professor Steer, with Dr. Walter P. Kosar, has completed a careful statistical analysis and comparison of the results on the private and the ward services, indicating the parts played by economic and technical factors in producing the slightly poorer record of the ward service. Dr. Harold Speert has been doing experimental work on animals on the physiology of the fatal thyroid. In collaboration with Professor Edith

H. Quimby of the Department of Radiology and Dr. Sidney C. Werner of the Department of Medicine, he has noted certain abnormal developments of later adult life, particularly with regard to the pituitary and thyroid glands, in animals so treated during their prenatal period of development. Work continues in collaboration with the Department of Pediatrics on the problem of congenital anomalies.

The research on gynecologic cancer is being actively carried on in the hands of Dr. Lieberman, Professor Gray Twombly, Dr. Gusberg, Dr. Speert, Dr. Jailer, and Professor Engle. Dr. Lieberman has spent much of his time since coming to the Department in September, 1950, in setting up and perfecting methods and techniques for a broad study of steroid metabolism in relation to carcinoma. Professor Twombly is working with a radioactive isotope of the estrogen diethylstilbestrol, which was synthesized in his laboratory. His particular interest has been to determine whether this possibly cancerogenic substance becomes localized, after its administration, in organs in which cancer is known to occur with special frequency. With Dr. Joseph Blanchard, Professor Twombly is also studying the clinical application of radioactive colloidal gold in the treatment of advanced cancer of the ovary and uterus. Dr. Gusberg is continuing in the general field of study of the precursors of cancer of the genital tract and the development of myomas of the uterus. Dr. Jailer's contact with the cancer problem has been related to his interest in the adrenal and has been concerned with the hyperplasias of the adrenal cortex producing adrenal virilism. Professor Engle has continued studies on the cytochemical constituents of the human ovary and the hormone producing tumors of the ovary.

A number of studies in the clinical aspects of obstetrics and gynecology have been completed and others are under way. Dr. Stanley M. Bysshe has completed a study of premature separation of the placenta; Dr. William V. Cavanagh, a study of the etiology of endometriousis; Dr. Joseph Blanchard, a study of the fetal deaths in toxemia of pregnancy; Dr. Equinn W. Munnell, a study of the results of myomectomy; Professor Howard C. Moloy and Professor Steer, a study of a new method of estimating cephalopelvic disproportion; Professor Steer, a study of the effect of the type of delivery on future childbearing; Dr. Alvin J. B. Tillman, a study of the classification and management of the toxemias of pregnancy. Work is being done by Professor D'Esopo on urinary incontinence and fistulas and by Professor Taylor on the radical surgery approach to uterine cancer.

Members of the Department have engaged in many activities outside of the Medical Center. Lectures or papers have been presented on at least fifty occasions within the city and in other places. Professor Taylor was the principal foreign speaker at the Biennial Congress of the Deutsche Gesellschaft für Gynäcologie in Göttingen, Germany, in April, 1951,

and later accepted invitations to lecture at the universities of Zagreb and Belgrade in Yugoslavia. Professor Engle was the guest speaker at the annual meeting of the Los Angeles Obstetrical Society; Professor Buxton, at the Chicago Medical Society's Postgraduate Assembly; Professor Twombly gave two lectures in Paris and one in London; and Dr. Jailer spoke in Chicago, San Francisco, and other places. Professor Taylor delivered the James Ewing Memorial Lecture, two of the Stuart McGuire Symposium lectures at the Medical College of Virginia, and the George Birney Broad Memorial lecture at the State University of New York Medical Center in Syracuse. Drs. Bysshe and Marion D. Laird will attend the Jubilee Congress of the Société de Gynécologie in Paris in June.

Two of the members of the Department have been granted fellowships—Dr. Jailer, the Senior Damon Runyon Clinical Cancer Fellowship, and Dr. Shettles, the John and Mary R. Markel Foundation Fellowship. Dr. Butler was awarded the degree of Doctor of Medical Science by the Faculty of the College for his thesis on "A Study of Serum Trysin Inhibitor in Pregnancy." Dr. Bysshe, Dr. Munnell, and Dr. Cavanagh have been elected members of the New York Obstetrical Society and Dr. Buxton, Secretary of the Obstetrical Section of the New York Academy of Medicine. Professor D'Esopo is serving on the Obstetrical Advisory Committee of the City Department of Health. Professor Taylor served during the year as President of the New York Obstetrical Society. Professor Engle has continued to serve on several national committees, notably on committees of the National Research Council and American Medical Association and as consultant to the Atomic Casualty Commission and Atomic Energy Commission.

The Department of Obstetrics and Gynecology is looking forward to a year of considerable progress. The long-needed laboratories will be available and it is hoped that this will vitalize the effort to produce sound scientific investigation and to develop a staff of obstetricians and gynecologists with a strong interest and knowledge in the fundamental problems of the reproductive function. In addition to the availabliity of the laboratories, the first step toward the institution of a nucleus of full-time members of the Department will be taken on the first of July, 1951. Although some difficulty is anticipated in obtaining interested and qualified young members for such a full-time group, it is believed that this addition, in time, can be accomplished. This step is regarded as extremely important, not only for this institution but for the specialty of obstetrics and gynecology as a whole, since this branch of medicine has throughout the country enjoyed few of the many possibilities for development to which full-time workers can contribute.

DEPARTMENT OF OPHTHALMOLOGY

Professor JOHN H. DUNNINGTON, Executive Officer

There has been no radical change in the undergraduate teaching of ophthalmology within the past year, but greater emphasis has been placed on the sectional teaching in the outpatient department. Particular attention has been directed towards familiarizing the student not only with local ophthalmological conditions but also with the ocular manifestations of systemic disease. It is our hope that in the future more time can be allotted for demonstration and discussion of this latter phase. A four months' full-time preresidency training course was given again this year to future members of our resident staff and to others with residencies in approved institutions. In addition to this group, fourteen visiting scholars studied with us, and four fellows from the Heed Ophthalmic Foundation received postgraduate training in ocular pathology and surgery. It was the great privilege of the Department to have stimulating visits from Professor George R. Scott of the University of Edinburgh, Scotland; Professor Derrick T. Vail of Northwestern University; Dr. Florian Verrey, Chief of the Eye Clinic at the University of Zurich; and Professor Alan C. Woods of Johns Hopkins University.

On September first the resignations of Drs. Arthur G. DeVoe and Raymond G. Ingalls were accepted with regret. Dr. DeVoe has become Professor of Ophthalmology at New York University, and Dr. Ingalls has gone into private practice in Boston.

Working under the auspices of the Knapp Foundation Professor Ludwig von Sallmann has completed his studies on the exchange and penetration of radioactive indicators in normal and irradiated lenses of rabbits. The effect of local and systemic cortisone therapy on the cytology and intraocular pressure in experimental uveitis is under investigation, as is the effect of this form of therapy on the permeability of the blood aqueous barrier and on the resorption of red blood cells from the vitreous. In addition to these experimental studies Professor von Sallmann, in collaboration with Dr. Ira Jones, has made clinical observations on the effectiveness of these hormonal substances in a large variety of ocular conditions. He and Dr. John C. Locke have completed their cytological and bacterial studies on the aqueous humor in uveitis in man.

Under the direction of Professor von Sallmann, Dr. R. Lawrence Wiggins, a fellow of the Knapp Foundation, reported before the Association for Research in Ophthalmology his observations on the usefulness of Polymyxin B in the treatment of pyocyaneus infections of the cornea in rabbits. With the aid of a grant from the Knapp Foundation Dr. Raymond Collins is elaborating on his previous studies on experimentally produced sympathetic

ophthalmia using uveal pigment and adjuvants. Dr. Andrew de Roetth, Jr., has completed his studies on "The Metabolism of the Cornea." These investigations have been accepted as his thesis in partial fulfillment of the requirements for the degree of Doctor of Medical Science by Columbia University.

Professor George K. Smelser's study of the effect of contact lenses on corneal physiology which has been carried out under a contract with the Office of the Surgeon General for the past two and a half years has been completed. Out of these investigations, in which he has had the collaboration of Mr. Isidore S. Finkelstein of the School of Optometry, Dr. Victor E. Kinsey of Harvard University, Dr. Richard G. Abell of Bellevue Hospital, and Professor John P. Macnie, has emerged an apparatus to evaluate the performance of several types of contact lenses under practical conditions. This part of the work will be carried on by the United States Army under the supervision of Major James L. McGraw, a former member of this Department. Professor Smelser, with the aid of three volunteer students, has studied the metabolic requirements of the human cornea in vivo and found for the first time that the cornea not only can use but actually requires atmospheric oxygen for the maintenance of its normal optical qualities. He has also studied the histological changes in the cornea of guinea pigs fitted with contact lenses and has demonstrated that after their use there is marked hydration of the corneal stroma, separation of the connective tissue lamellae, and disappearance of the epithelial glycogen. In recognition of his work on the production of a masterful film on "The Embryology of the Eye" the American Academy of Ophthalmology and Otolaryngology has elected him an honorary member. He has also presented his findings on the influence of ACTH and cortisone on experimental exophthalmos before the Association for Research in Ophthalmology.

Professor Zacharias Dische has continued his studies on the role of the oxidation of thiol groups in lens proteins during the formation of cataract. As the result of these studies we now have a clearer conception of the chemical changes that occur in the development of cataract.

Professor Seymour P. Halbert's investigations have shown that antibiotic-producing bacteria are commonly present in the bacterial flora of the conjunctival cul-de-sacs. He is now studying the relationship of such antibiotic-producing bacteria to the course of superficial ocular bacterial infections.

In the Knapp Memorial Laboratory of Physiological Optics Professor LeGrand H. Hardy, Dr. Gertrude Rand Ferree, and Miss M. Catherine Rittler have completed the production of plates for testing color vision. At present they are being evaluated by the National Bureau of Standards, the United States Air Force at Randolph Field, the New London Submarine

Base, and the Department of Agriculture Marketing Service, but it is believed that these plates do successfully screen, classify, and quantitatively evaluate defective color vision.

Dr. Otto Lowenstein, working with grants from the Harriman Glaucoma Fund and the Snyder Ophthalmic Foundation, has continued his pupillary studies on glaucoma and multiple sclerosis in old age. In each of these conditions a special type of pupillary response is demonstrable.

Among the many clinical investigations that have been conducted is the one on retrolental fibroplasia by Professor Algernon B. Reese, Dr. Frederick Blodi, and Dr. Locke. Of particular interest is their finding that ACTH given early in the disease is effective in arresting its progress. In this work they have had the collaboration of Professor Richard L. Day and Dr. William A. Silverman of the Department of Pediatrics. In addition to their clinical studies Professor Day and Dr. Silverman have studied histologically the eyes of ninety-two stillborn or early deceased premature babies in their endeavor to learn more about the pathology of this disease. The interest aroused by these investigations is evidenced by the nine lectures on this subject given by Professor Reese during the past year.

Most of the research activities have been financed through grants-in-aid, and deep appreciation is expressed to the many donors for their generous help; without these funds the investigations of this Department would be greatly curtailed.

Some of the distinctions which have come to the members of our Department within the past year are the following. Professor Dunnington has served as President of the American Ophthalmological Society, Chairman of the American Board of Ophthalmology, and on the Board of Directors of the National Society for the Prevention of Blindness. Professor Reese delivered the Proctor Lecture at the University of California, received the Howe Medal of the American Ophthalmological Society, and presented his studies on retrolental fibroplasia before the Sixteenth International Congress of Ophthalmology in London and the Sixtieth International Congress of Pediatrics and World Health Organization in Geneva, Switzerland. Professor Gordon M. Bruce was elected Editor of the *Transactions of the American Ophthalmological Society* with Dr. Charles A. Perera as his assistant. Professor von Sallmann, in connection with studies on radioactive isotopes, was a guest speaker before the National Research Council, Division of Medical Science, for the United States Atomic Energy Commission and was a member of a conference at the Biological Division of the Oak Ridge National Laboratories. Many other members have also presented papers before local and national societies and have been guest speakers at various meetings both in this country and abroad.

DEPARTMENT OF ORTHOPEDIC SURGERY

Professor ALAN DEFOREST SMITH, Executive Officer

The New York Orthopaedic Hospital made its long contemplated move to the Medical Center on December 26, 1950. This has made the clinical material more available for the medical students and has eliminated the time previously lost in traveling back and forth to Fifty-ninth Street. It has made it possible also to integrate better the teaching of trauma and reconstructive orthopedics and thus to avoid giving the impression that these two phases of orthopedic surgery are separate entities.

Dr. Walter A. L. Thompson, who has been a member of the Department for thirteen years as resident, fellow, and attending surgeon, resigned on September 1, 1950, as Assistant Clinical Professor of Orthopedic Surgery and Associate Attending Orthopedic Surgeon to accept the Professorship of Orthopedic Surgery at New York University. Dr. Beckett Howorth resigned as Assistant Clinical Professor of Orthopedic Surgery and Associate Attending Orthopedic Surgeon on March 1, 1951, in order to devote more time to his practice. Dr. Howorth had been on the staff since 1927. Dr. Paul J. Strassburger resigned as Instructor in Orthopedic Surgery and Assistant Attending Orthopedic Surgeon. We regret very much the loss of these men, whose services have been most valuable to the Department.

The Department was reorganized to conform with changes brought about by the move of the Hospital to the Medical Center, including the incorporation of the Fracture Service. Four divisions were set up, including Men's, Women's, Children's Orthopedics, and Fractures. Professors Halford Hallock, Leonides A. Lantzounis, Frank E. Stinchfield, and Harrison L. McLaughlin were placed in charge of these divisions.

The following promotions were made: Dr. Frank E. Stinchfield, to Professor of Clinical Orthopedic Surgery; Dr. Frederick M. Smith, to Associate Professor of Clinical Orthopedic Surgery; Drs. Melvin B. Watkins and Everett C. Bragg, to Assistant Clinical Professors of Orthopedic Surgery; Dr. Charles Ryder, appointed Instructor in Orthopedic Surgery.

The following clinical investigations were carried out during the year: the use of the head of the ulna as a bone graft in treatment of nonunion of fracture of the lower end of the radius by Professor Smith and Dr. Keith McElroy; intertrochanteric fractures of the femur by Dr. Charles S. Neer; results of naviculo-cuneiform arthrodesis in weak feet by Professor Hallock; a goniometer for use in arthrodesis of the ankle by Drs. John J. Gartland, Jr., and W. Robert Shea; evaluation of shoulder fusions and of flexor plasties of elbow by Drs. Robert E. Carroll and Shera; surgical treatment of herniation of *nucleus pulposus* with and without spine fusion by Professors

Hallock and John E. Scarff and Dr. William U. Cavallaro; results of resection of outer end of clavicle by Drs. Cline D. Hensley, Jr., and John A. Woodcock; separate studies of long-term results of spine fusions for low back disorders by Professor Everett C. Bragg and Dr. Woocock and by Professor Melvin B. Watkins and Charles T. Ryder; a statistical study of four hundred patients treated in the low back clinic by Professors Bragg and Watkins; the relative effects of compound E and F, locally and systemically, in cases of arthritis by Drs. Albert Grokoest of the Department of Medicine and Charles T. Ryder; results of various surgical procedures on the lower extremity for spastic paralysis by Professor Walter A. L. Thomson and Dr. Ryder; a study of coxa vara by Dr. Thomas H. Brown, Jr.; continuation of study of effects of streptomycin in bone and joint tuberculosis by Professor Alan DeForest Smith and Dr. Horace I-sen Yu; recurrent dislocation of the shoulder by Professor Harrison L. McLaughlin and Dr. George J. Solas; efficacy of surgical intervention in cases of Friedreich's ataxia by Dr. Myer Makin.

The following research studies were carried out: the influence of hypothermia in bone growth by Professor Stinchfield and Dr. McElroy; the study of the nature of ground substance in bone repair by Professor Stephen S. Hudack and Drs. J. Wallace Blunt and Mauer.

A motion picture was made by Dr. McElroy illustrating the results in vitallium arthroplasty in which cortisone was used.

Twenty-nine papers were published by the staff.

DEPARTMENT OF OTOLARYNGOLOGY

Professor Edmund P. Fowler, Jr., Executive Officer

The changes in the teaching staff of the Department of Otolaryngology include the resignation of Dr. Lee R. Pierce for reasons of health and the appointment of Dr. Anderson C. Hilding, Professor of Otolaryngology at the University of Minnesota, as Professor for one year while on sabbatical leave. We have had visiting scholars from Sweden, Denmark, England, India, Egypt, The Netherlands, Finland, and Switzerland. Professor Yrjo Meurman, President of the International Collegium Otolaryngologicum, gave talks both on cancer of the larynx and audiology, and Professor Emil Luscher of Basle gave a most interesting lecture to the staff on masking in audiology.

Research work in the Department has continued on the psychosomatics of the ear, nose, and throat, A notable finding by Professor Edmund P. Fowler, Jr., and Dr. Adolf A. Zeckel of the Department of Psychiatry is that Ménière's disease is primarily a psychosomatic one. Professor Fowler is now working on the psychosomatics of other types of deafness.

A Fulbright fellow, Dr. Jean Baron, has been conducting experiments

on the ablation of the antagonist and synergist eye muscle in mice and has confirmed his findings in fish, namely that muscles in the eye are dominant in the subjective symptom of vertigo and in special orientation. Dr. Alfred J. Magee of the Department of Ophthalmology has been using our facilities hoping to find a method to pick up the action potentials from the eye muscles created by nystagmus. Dr. Jules G. Waltner and Dr. Theodore Brandow have been working on the bacteriology of external otitis and its treatment.

Professor Fowler, with Dr. Daniel DeWitt, has continued experiments on the common cold, vasomotor drugs, and antihistamines. This work has been supported by the Philip Hanson Hiss Memorial Fund, a grant from the Ciba Pharmaceutical Products, Inc., and another grant from the United States Public Health Service. Professor Fowler, assisted by Mr. Peter D. Westerhoff, has extended the experiments producing hyperostoses in the temporal bones of guinea pigs with cold water. They have also been developing photographic techniques for research and clinical application and studying the circulation in the conjunctiva of patients suffering from various diseases, namely otosclerosis, Ménière's disease, migraine, and others.

Miss Zia Javid, graduate student in the Department of Physiology, investigated the fundamental effects of procaine on the circulation in relation to improvement of the circulation and the disappearance of tinnitus with intravenous procaine in Ménière's disease. This is also in the field of the study of fundamental vasomotor effects in the nose and in the ear, which is under the United States Public Health Service grant.

Professor Emeritus John D. Kernan has continued his studies on invasion patterns of carcinoma of the larynx, using serial sections. Professor Frantz Altmann has been working on the intramucosal cancer of the larynx. He has also completed a study on the histological picture of inherited nerve deafness in man and animals and, in collaboration with Dr. Fernand Montreuil, has finished his work on the experimental clinical investigation of the surgical treatment of Ménière's disease. He is also working on the normal anatomy of the auditory ossicles and physiological changes at various ages and, in collaboration with Dr. Waltner, on the physiology of labyrinthine fluids. Dr. Waltner has been concentrating mainly on the chemical nature of the perilymph and endolymph. To clarify the basic physiology of these fluids he is also doing extensive histological studies on cats.

Dr. Albert R. Kolar has been studying the pneumatization of the skull in humans and certain animals, particularly the gorilla. Dr. Paul Lindenberg, assisted by Mr. Maurice Bretzfelder, has developed and improved a machine for psychogalvanic skin resistance measurement of the hearing of children and has continued his work on screening those with hearing disorders from a large number of individuals.

Enlargement of the laboratory space has assisted materially in the teaching

of residents and has increased the enthusiasm of members of the Department to continue research activities.

DEPARTMENT OF PATHOLOGY

Professor Harry P. Smith, Executive Officer

It is a pleasure to report progress in arranging for more effective use of the autopsy service in the teaching of students. The pathology amphitheater has been converted into a large autopsy room, with adequate space for two autopsy tables. Movable pipe-stands are being constructed, capable of seating the entire class in the immediate vicinity of an autopsy table while the autopsy is being done. With this arrangement, it will also be possible to bring smaller groups of students together at frequent intervals for review of isolated specimens collected when the class is otherwise engaged. This use of current material is extremely important in the teaching of students; it provides a most valuable supplement to the systematic study carried out in the classroom. It is no exaggeration to say that the autopsy room is as important in the teaching of pathology as the wards and outpatient departments are in the teaching of clinical medicine.

The Department has been strengthened by the organization of a Division of Orthopedic Pathology, under the immediate supervision of Professor C. Zent Garber. Professor Garber has been a member of our Department for a number of years, but until recently was stationed at the New York Orthopedic Hospital and Dispensary on Fifty-ninth Street. The transfer of all orthopedic activities to the Medical Center will make it possible to coordinate these activities with those of other departments. We are particularly pleased at the prospect of bringing orthopedic pathology into close association with the other divisions of the Department. This should strengthen the specialized activities of Professor Garber and should prove to be a stimulus to those who work in the field of general pathology. We are certain that the clinical workers in orthopedics will also profit from close association with pathologists of diversified talents and interests.

The research activities of the Department have progressed in a satisfactory manner. In the Division of General Pathology, Professor Joseph E. Flynn and Drs. Robert W. Coon and Philip S. Vassar have conducted studies on a lipoid inhibitor of blood coagulation, thus bringing a little closer the day when the clinical possibilities of the material can be determined. Professor Flynn and Drs. Coon and Vassar are at present engaged in efforts to solve important problems in this field.

Dr. Donald W. King has undertaken studies on cell fractionation, with special reference to the distribution of thromboplastic substances. This work,

still in a preliminary stage, suggests that thromboplastic substances are more widely distributed than was formerly supposed to be the case.

Dr. Wellington B. Stewart, with the collaboration of Dr. Robert S. Stone, resumed the studies on iron metabolism which he had carried on before becoming a member of this Department. This project involves a study of absorption and metabolism of iron through use of radioactive isotopes.

Dr. Joseph Seronde, Jr., has made considerable progress in his studies on the reaction mechanics of antithrombin. These studies have not yet been published, but the data already obtained promise to provide new viewpoints and a new approach to other problems in this general field.

The Division of Neuropathology, under Professors Abner Wolf and David Cowen, conducts undergraduate instruction for the second-year class of medical students. A complete examination of the nervous system was carried out in 220 adult autopsies, including 67 from the Neurological Institute. Professors Wolf and Cowen also cooperated with the Division of Pediatric Pathology in making brain examinations on 148 infant autopsies from Babies Hospital and from Sloane Hospital. In addition, there were approximately three hundred surgical specimens from the Neurological Institute. Professors Wolf and Cowen also held numerous conferences with members of the Neurological Institute and aided in a major way in training residents from that unit.

In collaboration with members of the Departments of Neurology and Neurological Surgery, a long-term evaluation was made of brain tumor cases from the Neurological Institute. Professors Wolf and Cowen also published papers on experimental congenital toxoplasmosis in the mouse; they collaborated with Professor Elvin A. Kabat of the Department of Bacteriology in making studies on allergic encephalitis in monkeys. In collaboration with Drs. Irwin Feigin and Estelle Geller of the Central Research Division of the Bronx Veterans Administration Hospital, they carried on an interesting series of studies on the effects of cortisone on the healing of wounds in the brain. Studies are in progress concerning acid and alkaline phosphatase activity in healing wounds of peripheral nerves, as compared with that in wounds of the central nervous system.

The staff in Pediatric Pathology consists of Professors Beryl H. Paige and Dorothy Andersen, Dr. Arthur A. W. Roe of the Department of Pediatrics, and Dr. Madoka Shibuya. The routine work of the Department includes the surgical pathology of the Babies Hospital and the post-mortem examination of infants dying in the Babies Hospital and of stillbirths and neonatal deaths in Sloane Hospital. A course in pediatric pathology has been given to the fourth-year class as part of their work in pediatrics. This gives special emphasis to congenital heart disease.

Professor Paige has continued her collaboration with Professor Katharine

K. Merritt of the Department of Pediatrics in the study of congenital abnormalities in relation to illness during pregnancy. Professor Andersen has also continued her study of the celiac syndrome, in collaboration with a group of pediatricians. Studies of the susceptibility of patients with fibrocystic disease to heat prostration are being published.

The recent installation of a premature unit has enabled the Hospital to accept an increased number of premature infants. This has permitted intensive study of such cases by all members of the staff.

Professor Richard L. Day and Dr. William A. Silverman of the Department of Pediatrics are studying the effectiveness of ACTH in preventing the blindness due to retrolental fibroplasia which commonly occurs in premature babies. Professor Andersen has also been a member of the Committee on Neonatal Mortality of the Academy of Medicine, which has been investigating the causes of infant deaths in New York City for the year 1950–1951.

Professor Theodore F. Zucker and Dr. Lois M. Zucker have conducted preliminary studies on the toxicity of the carcinogenic agent, 2-acetylaminofluorene. This compound is not toxic when given to rats which are maintained on a standard mixed diet. It does show marked toxicity, however, if the rats are maintained on certain purified diets. It would appear that a well-rounded diet contains "antitoxicity" factors; indeed, it has already been possible to prepare crude concentrates of such factors from liver and from yeast. If such factors can be found and isolated, it will be possible to use them to prevent toxicity of this compound in studies involving the role of diet in the production of cancer.

Professor Henry S. Simms has continued to collaborate with Professor Kenneth B. Turner of the Department of Medicine. He has shown that the serum of patients with arteriosclerosis contains abnormally large amounts of free lipfanogens of the type described in previous reports. Certain changes in the "antilipfanogen" balance are also reported.

Dr. Benjamin N. Berg has joined Professor Simms in his study of disease in rats at different ages. These studies will form a basis for future studies in which effort will be made to influence the mortality rate through various experimental procedures.

Dr. Hans Kaunitz, in collaboration with Dr. Charles A. Slanetz, has made additional studies on the characterization and distribution of their new factor which has many of the properties of vitamin A. It is found in lard; it is sensitive to alkaline and resistant to acids, but it loses its activity when hydrogenated. It may well be that deficiency in man and animals may often be due to a lack of the new factor, not to a lack of vitamin A as commonly supposed.

DEPARTMENT OF PEDIATRICS

Professor Rustin McIntosh, Executive Officer

The predoctoral course as presented to undergraduates in the Medical School has, in general, continued to afford them a satisfactory measure of competence and clinical self-confidence. In spite of dissatisfaction with the third-year course, shared by students and instructors alike, the work in the fourth year has more than made amends. The instructional staff derives satisfaction from the report that a large fraction of the fourth-year class has indicated its intention of choosing pediatrics as a specialty. Changes in the curriculum, voted by the Faculty during the past academic year and due to be put into operation in June, 1951, presumably will effect an improvement in the teaching techniques of the third year, although at the expense, so far as pediatrics is concerned, of the fourth year. The results of these changes will be watched with interest.

Besides student reaction to the teaching program, a reliable criterion of clinical maturity is the level of discussion applied by students in their annual competition for the William Perry Watson Prize. This year the papers submitted reflected sound judgment and a broad concept of the problems of illness in childhood. The Prize was won by Herman Roiphe.

New appointments in the Department include those of Dr. Jerome L. Kohn, Assistant Clinical Professor, Drs. Sidney Blumenthal and Alfred L. Florman, Instructors, all at Mount Sinai Hospital; Dr. Walter R. Kessler, Assistant. Dr. T. Cambell Goodwin, at the Mary Imogene Bassett Hospital in Cooperstown, was promoted from Assistant Professor to Associate Clinical Professor. On the full-time staff, Dr. Conrad M. Riley and Dr. Paul A. di Sant'Agnese were promoted from Associate to Assistant Professor and Dr. Ruth C. Harris from Instructor to Associate. Drs. Douglas S. Damrosch, William A. Silverman, and James A. Wolff of the part-time staff were promoted from Instructor to Associate.

With deepest regret the resignation of Professor Donovan J. McCune is reported. An able teacher and outstanding clinician, his long record of loyal service to the University and to the Hospital was brought to a close for reasons of health. Dr. Bertram R. Girdany resigned in order to accept a post in the Children's Hospital of Pittsburgh.

The research activities of the Department continue to suffer seriously from limitations of laboratory space. This grave handicap, mentioned in previous departmental reports, still stands out in bold relief as a stark threat to the healthy development of pediatrics at Columbia. Professor Hattie E. Alexander, in collaboration with Dr. Rose G. Ames, Professor Jerome L. Kohn, and a number of physicians attached to Willard Parker Hospital, completed an evaluation of various therapeutic agents in their comparative effect

on the clinical course of whooping cough. She collaborated with Dr. Douglas S. Damrosch in a long-term study of the efficacy of streptomycin and of various adjuncts in the treatment of serious forms of tuberculosis occurring in infants and children. An additional aim of her study is to investigate the influence of injections of P.P.D. (Purified Protein Derivative of the tubercle bacillus) on the tuberculous meningeal infection in most severe cases. Her investigations in the microbiology of *Haemophilus influenzae,* in which she has the valued assistance of Miss Grace Leidy as research worker, continue to yield fruitful results. These varied activities have been generously supported by the United States Public Health Service and by the Department of Health of the State of New York.

The long-term project on the study of chronic nutritional disorders, of which Professor Dorothy H. Andersen is the responsible investigator, continues to share the attention of an investigative team which includes Professor John M. Brush, Dr. Joseph A. Costa, Dr. Paul A. di Sant'Agnese, Dr. Paul E. Wilson, and others. This work has for several years received generous support from the Commonwealth Fund.

Professor John Caffey's studies in pediatric radiology have directed widespread attention to a new syndrome, the change in the bony skeleton produced by excessive intake of vitamin A. In addition to this and other contributions of relatively modest scope to the periodical literatue, Professor Caffey has brought out a new and greatly enlarged edition of his textbook *Pediatric X-Ray Diagnosis,* first published in 1945. The reception which this text has received throughout the world amply testifies to its unrivaled position.

Professor Richard L. Day's studies of the pathogenesis of kernicterus, which receive support from the United States Public Health Service, are being actively pursued. Professor Day has collaborated with Dr. William A. Silverman and with Professor Algernon B. Reese, Dr. Frederick Blodi, and Dr. John C. Locke of the Department of Ophthalmology in a clinical inquiry into the pathogenesis of retrolental fibroplasia and its response to treatment with the adrenocorticotropic hormone of the pituitary gland. In collaboration with Dr. Rose G. Ames of the Department of Pharmacology, Professor Day has applied a grant from Playtex Park Research Institute to studies of urinary excretion by premature infants and the control of urine volume by antidiuretic hormone.

Dr. Ruth C. Harris has received a grant from Mead Johnson Research Laboratories to support her studies of liver function in young subjects. Professor Katharine K. Merritt is continuing her investigations into the effects of illness occurring during pregnancy on the growth and development of the infant, a project in long-term analysis of meticulously gathered data which has been generously supported by the Rockefeller Foundation

and by the Department of Health of the State of New York. Dr. Conrad M. Riley's studies of nephritis and nephrosis are being actively pursued. Dr. James A. Wolff has made a number of important observations concerning iron transport and storage in various forms of anemia encountered in infancy and childhood.

Several members of the Department attended the Sixth International Congress of Pediatrics, held in Zurich in July. Professors Alexander and Andersen contributed papers to the program and Professor McIntosh read a contribution on behalf of Dr. Conrad M. Riley.

Among the clinical facilities which the Hospital has opened up in recent months and which, therefore, add to the clinical research facilities of the Department should be mentioned the service for premature infants and the pediatric division of the Orthopaedic Hospital. Unfortunately this is not an unmixed blessing, since the augmented bed complement encroaches on our limited laboratory space by increasing the demand for diagnostic services, thereby reducing still further the resources available for experimental investigation. Expanded and greatly improved facilities for private practice offices in Babies Hospital promise to make possible a larger contribution of time by part-time members of the staff and by those whose working conditions approach "geographical full-time."

In the course of the academic year the Department has been honored by visits from a number of distinguished scholars, among whom may be mentioned Professor Robert Debré of the University of Paris, Dr. Edwards A. Park, Professor Emeritus of Pediatrics at Johns Hopkins University, Dr. Honor Smith of Oxford University, and Oberarzt Hans Zellweger of Zurich, who has been appointed head of the Department of Pediatrics in the University of Beirut, Lebanon, and who has come to Columbia under a grant from the Rockefeller Foundation to study American methods of teaching and organization before assuming his new duties.

Dr. Arthur Allport William Roe of Perth, Australia, held the Holt Fellowship.

DEPARTMENT OF PHARMACOLOGY

Professor Harry B. van Dyke, Executive Officer

In accordance with departmental policy, the instruction of second-year medical students was modified by introducing improved laboratory experiments and by increasing the participation of the staff in lectures. Professor George B. Koelle, a member of the staff for the first time this year, supervised the laboratory instruction and was responsible for the introduction of new experiments. Dr. Herbert J. Bartelstone of the Department of

Dental and Oral Surgery and Professor Koelle made unusual progress in the laboratory instruction of dental students who gained a correspondingly increased knowledge of the fundamental action of drugs. Second-year students also had the privilege of observing and participating in demonstration-experiments conducted by members of other departments. Special acknowledgment of this expert aid should be made to Professor Virginia Apgar of the Department of Surgery, Professor John W. Fertig of the School of Public Health, Professor Edith H. Quimby of the Department of Radiology, and Dr. John R. West of the Department of Medicine.

The popular course on applied pharmacology was again offered to fourth-year medical students. As in previous years, Professor Alfred Gilman and Professor Hamilton Southworth of the Department of Medicine took responsibility for the direction of this course.

Professor Gilman, in collaboration with Dr. James G. Foulks and Mr. Paul Brazeau, has continued studies on the renal transport of electrolyte. Particular attention has been paid to the effect of renotropic steroids on the tubular transport of thiosulfate and the identification of the transport system involved. A technique is being developed for the perfusion of the isolated kidney in order to study the autonomy of the kidney in transport functions. This work was supported principally by the United States Public Health Service.

Several aspects of the physiology of the neurohypophysis were under investigation by Dr. Rose G. Ames and Professor van Dyke. Dr. Ames, working in part in the Department of Pediatrics, studied the importance of this gland in the metabolism of water and electrolytes in premature and newborn infants. She has also introduced new procedures designed to test neurohypophysis. A desert rodent, the kangaroo rat, was found to excrete unusually large amounts of an antidiuretic hormone which is believed to be important in the conservation of water by this mammal. Dr. Ames and Professor van Dyke continued their studies on the relationship between the internal secretions of the adrenal cortex and the neurohypophysis. Professor Richard J. Block of the New York Medical College and Professor van Dyke analyzed further the distribution of amino acids in a pure protein of the posterior pituitary. Much of the research work of Dr. Ames and Professor van Dyke was made possible by grant from E. R. Squibb and Sons and the Playtex Park Research Institute.

Professor Koelle has continued his investigation of the histochemical procedure for localizing cholinesterases (ChE's) and has succeeded in eliminating diffusion artifacts. At present this investigation is supported by a grant from the United States Public Health Service. The modification is based on the incorporation of high salt concentrations in the incubation media and has been shown by recovery tests to effect complete precipitation

without inactivation of specific and nonspecific ChE's. With the improved method it has been found that specific ChE is present in high concentrations in the dendrites, cell bodies, and axones of all cholinergic neurones examined.

Investigation of the metabolism of important hypnotic and anticonvulsant drugs was continued by Dr. Everett W. Maynert with support from the United States Public Health Service. Studies on the metabolic fate of pentobarbital, Amytal, and Neonal have revealed a new pattern of biological oxidation. It is likely that these findings are applicable to other drugs containing alkyl chains. Results obtained in the dog are being checked in man in collaboration with Professor Emanuel M. Papper of the Department of Surgery. Experiments with drugs labeled with N^{15} require the use of a mass spectrometer. Determinations with this instrument were generously made by Professor David Rittenberg and Mr. Irving Sucher of the Department of Biochemistry.

Dr. Herbert J. Bartelstone of the Department of Dental and Oral Surgery actively investigated the permeability of the enamel, dentine, and cementum of teeth by employing radioactive tracer elements (I^{131} and Na^{24}). This work is being extended to other structures important in the mouth, such as the salivary glands. As a member of the United States Public Health Service, Dr. Bartelstone has assumed the responsibility of organizing a radiobiology laboratory in the United States Marine Hospital on Staten Island.

Professor Gilman was appointed a member of the Pharmacology Study Section of the United States Public Health Service. He continued to serve on the editorial boards of the American Journal of Physiology and Pharmacological Reviews. Professor van Dyke accepted appointment on the Committee on Growth of the National Research Council. During 1951–1952 he was editor of the *Journal of Pharmacology and Experimental Therapeutics.*

DEPARTMENT OF PHYSIOLOGY

Professor Magnus I. Gregersen, Executive Officer

The Department of Physiology, desiring to take an active part in defense work, is cooperating with the School of Aviation Medicine at Randolph Field, Texas, in four fields of investigation: motion sickness, evaluation of physical fitness, erythropoiesis, and blood volume. The contract with the United States Air Force is for a two-year period.

Drs. Norman R. Alpert, Frank G. Carpenter, and Robert E. Semple received the Doctor of Philosophy degree in physiology at the June, 1951, Commencement. Dr. Alpert has been advanced to Instructor and Dr. Hubert Sear has been appointed Instructor. Dr. Carpenter has accepted a

position at the University of Rochester School of Medicine, and Dr. Semple will return to his native Canada to a position at the University of Toronto. Dr. Peter D. Orahovats, a United States Public Health Service Fellow, has accepted a position at Merck Institute for Therapeutic Research, and Dr. Robert Nelson has resigned his instructorship to go into private practice.

Professor Dan H. Moore, Associate Professor of Anatomy, who has been on leave from the University for the last eighteen months as scientific liaison officer in the London Branch of the Office of Naval Research, returned to the University and resumed the directorship of the Electrophoresis Laboratory. Dr. Sidney J. Circle, Acting Director during his absence, has returned to the Glidden Company.

Professor Shih-Chun Wang has been awarded a Guggenheim Fellowship for research on the functional significance of the dorsal root vasodilator system and will spend his sabbatical leave in Ghent, Belgium, to work with Dr. C. Heymans.

Dr. Nelson supervised the teaching of the physiology course for students in the School of Dental and Oral Surgery, and Professor Louis J. Cizek was in charge of the course for first-year medical students. The Summer Session course was given under the direction of Professor Wilson C. Grant, and Professor Walter S. Root again taught the course on the autonomic nervous system at the Psychoanalytic Clinic. Professors Wang and Cizek taught the physiology course for occupational therapy and physical therapy students. Professor Thomas H. Allen was in charge of the physiology course for students in the School of General Studies. Dr. Nicholas Di Salvo organized and presented a new course on oral physiology to the postgraduate dental students. This course dealt with basic physiologic principles and their application to dentistry.

Professors Root, John L. Nickerson, Magnus I. Gregersen, Wang, and William L. Nastuk presented papers at the International Physiological Congress in Denmark in August, 1950. Professor Nickerson also took part in the First International Cardiological Congress in Paris in September, 1950. Eight members of the staff presented papers at the Federation meetings in Cleveland in April.

Professors Root and Grant are completing a study of sympathectomy and hemoglobin production of dogs in low O_2. Already completed is research with Dr. Orahovats on the effects of sympathectomy on Hb production of hemorrhaged dogs and the effect of the buffer nerve section on red cell volume. Professor Root and Dr. Carpenter investigated the effect of denervation of the bladder on pressure-volume curves and, with Dr. Ralph Veenema, studied the changes in bladder weight and pressure-volume curves of parasympthectomized bladders with exteriorized ureters.

Professor Root has served for the past year as Chairman of the Committee

on Scientific Aid of the American Physiological Society and has rendered valuable service as a member of the Executive Committee of the New York State Society for Medical Research, appearing before the Public Health Committee of the New York State Assembly on behalf of the Pound Bill. Professor Root has also been Vice President of the New York Academy of Sciences and Chairman of the Publications Committee of the Academy.

Professor Nickerson, who last fall became a member of the Editorial Board of the *American Heart Journal*, has continued his theoretical and clinical studies with the ballistocardiograph with support from the United States Public Health Service. The studies done in collaboration with Professor Robert L. Levy and Dr. James A. L. Mathers, both of the Department of Medicine, include an investigation of the effect of moderate walking exercise on patients. In addition, Professor Nickerson is collaborating with Professors George H. Humphreys, Ralph A. Deterling, Jr., and Ferdinand F. McAllister, all of the Department of Surgery, on studies on patients undergoing cardiovascular surgery. Professor Nickerson has worked with Dr. Leon Moses of the Department of Psychiatry on the effect of psychiatric analysis on cardiac output.

Professor Wang has received additional support for his investigations from the United States Public Health Service. Drs. Morris J. Frumin and Shinhsun Ngai, both of the Department of Surgery, are working with Professor Wang on two problems: the organization of the central respiratory mechanism (Professor Wang and his associates are engaged in obtaining and analyzing results bearing on this subject and, further, in localizing the origin of pneumotoxic, apneustic, and gasping respiration) and the physiological importance of the dorsal root mechanism.

Professor Wang is also completing two investigations, one with Professor Joseph H. Globus of the Department of Neurology on the neuropathological reaction to the implanted radon seeds in the central nervous tissue and the other with Mr. John O'Laughlin, third-year medical student, on the importance of the amygdala in the emotional expression of the cat.

Professor William W. Walcott and Dr. Wang Ch'un-i, Fellow of the American Bureau for Medical Aid to China, have completed a preliminary study on the reproducibility of the bleeding volume in dogs which was started during the summer of 1950 by Howard Thompson, Jr., and Stanley Einhorn, first-year medical students. Professor Walcott and Dr. Wang are now studying the factors which modify the bleeding volume. Professor Walcott has also completed a testing program for the new, large Scholander Recording respirometer which was one of the major additions to the laboratory equipment this year and which is being employed by Professors Gregersen and Walcott in the evaluation of factors influencing physical fitness in man.

Professor Thomas H. Allen has continued to work on the T-1824 dye

method for determining blood volume. With this improved dye extraction technique Professors Allen and Gregersen are engaged in further critical tests of the plasma-dye method and of the fate of T-1824 in the body.

In addition to his work with Professor Root, Professor Grant has developed a technique for the estimation of bone marrow mitotic activity by the use of colchicine. Professor Grant and Dr. Nelson have completed, with the assistance of James Smith, fourth-year medical student, a study on the influence of certain endocrine glands on erythropoiesis in rats.

Professor Nastuk's research activities have been devoted in part to a study of the depolarizing action of acetylcholine on the muscle end plate. A second study to determine the mode of action of a clinically important anti-curare compound has been carried out with the aid of a grant from Hoffmann-La Roche, Inc.

Professor Cizek and Dr. K. C. Huang, Fellow of the American Bureau of Medical Aid to China, have finished work on fluid exchange and diuretic responses in the dog during chronic salt depletion and have begun studies on dietary salt depletion in the dog and preliminary studies on fluid exchange in rabbits.

By the use of a new technique, developed by Dr. Di Salvo, it is possible to make more precise observations on the drinking response following intravenous injections of hypertonic fluids into dogs.

Professor Moore's work on shock in the Electrophoresis Laboratory is now supported by a grant from the Office of Naval Research. Professor Moore is continuing his investigation of secondary shock, begun in the laboratories of St. Mary's Hospital in London, and of the isolation of the mouse mammary cancer virus, which was begun at the University of Leeds in collaboration with Professor R. D. Passey and Professor W. T. Astbury. At the University of Leeds, virus-like particles of homogeneous size were separated by Professor Moore from the mouse tumor extracts by means of electrophoresis.

Dr. Norman Alpert completed a study on the respiratory metabolism of the dog during and following acute cardiac tamponade. Dr. Semple investigated fluid adjustments occurring in the rat after rapid salt depletion by intraperitoneal dialysis. Mrs. Louise Wang, a predoctoral United States Public Health Service Fellow, has completed a study of the normal blood volume of the rat with dye and is undertaking a comparative study with carbon monoxide.

In October Professor Gregersen was invited by General Hoyt Vandenberg to join a group as consultant to the Chief of Staff, United States Air Force, for a review of medical research in the United States Air Force covering facilities, budget, personnel, and management. In April Professor Gregersen was invited to address a meeting of the Houston Surgical Society and to

participate in the Fifth Annual Symposium on Fundamental Cancer Research in Houston, Texas, and in May he participated in a symposium on shock at the Army Medical Center.

Professor George H. Humphreys II of the Department of Surgery and Professor Gregersen spent most of March in Taiwan on a mission for the Economic Cooperation Administration and the United States Public Health Service. A report of their findings on the feasibility of forming a working relationship between the National Taiwan University Medical School and the College of Physicians and Surgeons has been submitted with recommendations from the Faculty to the Economic Cooperation Administration and the United States Public Health Service. On the return trip they visited the medical school in Hong Kong, the Siriraj Medical College and Chulalongkorn Medical College in Bangkok, and the Prince of Wales Medical School in Patna, India.

Among the many foreign visitors to the Department was Dr. Ronald T. Grant, Director of the Medical Research Unit of Guy's Hospital in London, who gave a lecture on wound shock. Dr. Denis Coulland of Paris spent the first semester assisting in the physiology course for dental students in order to acquaint himself with American teaching methods.

DEPARTMENT OF PSYCHIATRY

Professor Nolan D. C. Lewis, Executive Officer

The undergraduate, graduate, and postgraduate programs of instruction have been carried out as usual at the New York State Psychiatric Institute, and arrangements have been made to expand the third-year undergraduate course to include more child psychiatry and psychosomatic medicine during the coming year.

Research has progressed satisfactorily in the basic sciences related to psychiatry as well as in the clinical types of studies. Forty articles and two books have been published by members of the psychiatric faculty working at the Institute. Seventy-five addresses have been delivered before scientific and lay societies.

Professor Nolan D. C. Lewis gave the three McNair Lectures on the relationship between psychiatry and religion before the Institute for Research in Social Science at the University of North Carolina, November, 1950.

Professor Armando Ferraro held an organizational meeting in Paris the week of May 28, 1951, for the purpose of setting up the program for the First International Congress of Neuropathology which, it is expected, will be held in Rome during the summer of 1952. The organizational meeting

was attended by scientists of thirty-two countries. Professor Ferraro, who is Secretary-General of the Congress, formulated the idea of the Congress and did all the preparatory work.

As a member of the Board of Directors of the American Society of Human Genetics, Professor Franz Kallmann took an active part in organizing the publication of a new scientific periodical, the *American Journal of Human Genetics*.

Active research is still in progress on the various problems of psychosurgery, and some valuable extensive reports have been issued. It will require at least another year of follow-up work before one can evaluate the results.

Thirty-three psychiatrists and three volunteers, Drs. Harold Leopold, Herbert Pierson, and Selina Schryver, attended the Psychiatric Clinic during the year. Seventeen psychiatrists attended the Group Clinic.

Dr. Henry M. Hart has been active in a study of the psychiatric aspects of glaucoma. He has also maintained two case seminars for social workers, one for the staff at the Neurological Institute and the other for the medical social workers of the Presbyterian Hospital. These have been well received and stimulating.

Dr. Hugh Mullan has been doing some interesting group treatment work with some mothers whose children are being treated in the clinic. Dr. William A. Schonfeld has continued his research in adolescence. The specific prloblem now under study is personality problems associated with genecomastia. The effects of plastic surgery and psychotherapy will be evaluated, both when used separately and when used together. In the Department of Otolaryngology Dr. Adolf Zeckel has been working on otosclerosis and on a psychosomatic project concerning Ménière's disease.

The teaching of third-year medical students has continued to be our main obligation, as in other years. Two students worked in the clinic, one in the second trimester and one in the third trimester. On the whole, the students prefer to spend more time with patients at Vanderbilt Clinic, as they believe they will see more of these patients in private practice than frank psychotics.

Seventeen psychiatrists have attended the Group Clinic, now in its fifth year of operation at the Vanderbilt Clinic. This Group Clinic, which is similar to the group practice of medicine becoming more and more prevalent in the private practice of medicine, serves a useful purpose in emphasizing the relationship between psychiatry and other medical specialties in medical practice. We have had as usual two student social workers from the New York School of Social Work who, along with their field work training, have made a definite contribution to our clinic in their work with our staff and patients.

During 1950, 686 patients made 3,786 visits to the Psychiatric Clinic. The wards of Presbyterian Hospital requested 276 ward consultations.

The Psychoanalytic Clinic for Training and Research continued to expand its training facilities and to broaden the scope of its services to the profession, to its trainees, and to patients. Early in the fall term it appeared likely that the student body and younger staff would be decimated through calls from the armed services and that the United States Public Health Service funds, upon which the Clinic is largely dependent for support, would not be available for 1950–1951. After this inauspicious start, which threatened the entire program, it was particularly gratifying to receive the usual allotment from the United States Public Health Service and to finish the year with classes and staff essentially intact.

Major changes this year included the inauguration of Research Symposia in collaboration with the Department of Research Psychiatry of the Psychiatric Institute; the assignment of advanced students to the Admissions Office for the purpose of gaining diagnostic experience and increasing the number of patients who can be considered for treatment; a special treatment program for children; organized provision for training those students who are not certified at the end of three years; collaboration with the Department of Psychiatry and Neurology at Tulane University of Louisiana School of Medicine; the distribution of a student's manual to all students and staff members and the complete reorganization of the record room.

Through cooperation with Babies Hospital students particularly interested in children's work are able to undertake extensive, long-term treatment of four or more children, in addition to their work with adult patients, as part of their clinical experience leading to the Certificate of Training in Psychoanalytic Medicine. These cases are individually supervised by Dr. Nathan W. Ackerman and Professor David M. Levy of the Department of Psychiatry at Yale University.

Five graduates of the Clinic are now on the staff of the Department of Psychiatry and Neurology, Tulane University of Louisiana School of Medicine, under the direction of Professor Robert G. Heath. This year, as a part of the Clinic's collaboration with Tulane, about once a month a different member of the senior staff devoted two or three days to discussing his special interest with the group in New Orleans.

The Alumni Association of the Psychoanalytic Clinic established the John S. Poe Fund, in honor of its first president, who died last year. Staff members, students, alumni, and friends are continuing to contribute to this Fund.

The death last October of Dr. Fritz Wittels was a severe blow to the profession as well as to his many friends and colleagues. His attributes as a human being endeared him to all who had the privilege of knowing him,

and the Clinic is still receiving letters from people who read and admired his many excellent articles and books.

Professor Sandor Rado carried his usual heavy load of teaching and supervisory, organizational, and administrative responsibilities. Outside the Clinic, he addressed many professional groups, including the staff at the Institute of Living in Hartford and the students of the Department of Psychology at Vassar College. He lectured to the physicians in the graduate residency training programs of the Veterans Administration Hospitals in Canandaigua and Northport and at Walter Reed Hospital in Washington, where he delivered a series of lectures in his capacity as Consultant to the Surgeon General. He also served as President of the Association for Psychoanalytic Medicine.

Professor George E. Daniels spent a great deal of time on the psychosomatic research projects under his direction, in addition to his responsibilities as Associate Director of the Clinic. Dr. David M. Levy has accepted an appointment as a member of the Institute for Advanced Study at Princeton for 1952–1953.

Among the outstanding activities of staff members was the completion of *The Mark of Oppression* by Professor Abram Kardiner. This book, the culmination of five years of intensive research, was published by W. W. Norton and Company in May. Professor Kardiner conducted a research seminar in the Department of Sociology at Columbia University.

Dr. Nathan W. Ackerman was Director of the Council Child Development Center, Chairman of the Social Issues Panel of the Group for the Advancement of Psychotherapy, and lecturer in psychiatry at the New York School of Social Work. He has been doing research on the interrelation of social and psychological factors and on hypertension. Dr. Raymond de Saussure delivered a two-term course of lectures at the New York Psychoanalytic Institute. He was chosen as one of the reporters of the International Congress of Psychiatry in Paris in September, 1950.

Dr. John A. P. Millet was active as representative of the American Psychoanalytic Association to the Program Committee of the World Federation for Mental Health, as a member of the Committee on International Relations of the American Psychiatric Association, as Chief Psychiatrist to the American Rehabilitation Committee, and as a member of the Advisory Committee to the Division of World Affairs of the National Association for Mental Health. Dr. Nathaniel Ross has continued in his capacity as Associate Editor of the *Bulletin of the American Psychoanalytic Association* and is now Associate Editor of a new yearbook, *The Annual Survey of Psychoanalysis*. Dr. George S. Goldman has recently been elected President of the Medical Board of Hillside Hospital.

Drs. Aaron Karush, Irwin Marcus, Lionel Ovesey, and Leon Moses are

coordinating case demonstrations, clinical conferences, and supervisory conferences. Besides his collaboration with Professor Kardiner, Dr. Ovesey participated in Professor Kardiner's research seminar in the Department of Sociology. He was appointed Associate Attending Psychiatrist at the Psychiatric Institute and has been conducting two-hour weekly conferences for the resident staff.

Dr. Irwin Marcus has been a member of the staff of the Jewish Child Guidance Institute and of the Council Child Development Center where, in addition to activities in child psychiatry, he has engaged in research on the "Group Therapy of Fathers," to be published in the *Journal of Group Therapy*. Dr. Marcus is resigning from the Clinic on June 30th to take up his duties as Associate Professor of Psychiatry and Head of the Department of Child Psychiatry at the Tulane University of Louisiana School of Medicine.

Dr. Milton Sapirstein has been appointed senior consultant at the Bronx Veterans Administration Hospital and will supervise the teaching program for residents. Dr. James P. Cattell has continued to be in charge of the Inpatient Service. Dr. Cattell has done a great deal of research during the year, including studies of psychiatric patients undergoing psychosurgery, those under the influence of drugs, and an investigation of deterioration in schizophrenic patients.

The Medical-Psychiatric Division and Psychosomatic Service under the direction of Professor Daniels has had a very busy year in all phases of activity.

Dr. Harold I. Lieb resigned from the staff to join the faculty at the Tulane University of Louisiana School of Medicine but will retain a connection with Columbia due to an arrangement with Tulane for collaboration with the Psychoanalytic Clinic for Training and Research. Drs. B. Ruth Easser, Felix E. Hoffman, and Charles C. Hogan joined the staff, increasing the size of the staff and helping with ward consultations, research, and teaching. Professor George H. Humphreys II of the Department of Surgery has asked the Psychosomatic Service to cooperate with the Department of Surgery in connection with some of their problems and has assigned space for an office and interviewing room. Dr. Kenneth Kelley is at present attending surgical rounds as a psychiatric consultant. Dr. Walter A. Stewart has been attending rounds with Professor Kenneth B. Turner of the Department of Medicine. Dr. Aaron Karush has continued to attend the Combined Ulcerative Colitis Clinic as the psychiatric consultant. Dr. Hogan was invited by Professor Sidney C. Werner of the Department of Medicine to act as psychiatric consultant in the Endocrine Clinic, a position that had been filled by the late Dr. Poe.

During the year seven undergraduate students took their elective in psychiatry with the Service under the supervision of Drs. Hoffman and Hogan.

Funds were received in October, 1950, from the United States Public Health

Service for continuation of the research in ulcerative colitis. The work in the psycho-physiological laboratory is progressing well with the close cooperation of Professor Humphreys and Dr. Robert B. Hiatt of the Department of Surgery. Dr. Hiatt continues to direct the physiological studies, and Dr. Karush is conducting the psychiatric studies and therapy.

The study of psychological factors in amenorrhea, conducted with the cooperation of the Department of Obstetrics and Gynecology under the sponsorship of a United States Public Health Service grant, is coming to a close. Unselected cases of secondary amenorrhea were studied by Drs. Kenneth Kelley, B. Ruth Easser, Russell R. Monroe, and the late John Poe from physiological, endocrinological, and psychological aspects. Dr. Moses is continuing psychoanalytic and ballistocardiographic studies of a case of essential hypertension. The pilot study on the psychological implications of menorrhagia has been continued by Dr. Felix Hoffman.

The research project headed by Dr. Millet on peripheral vascular disorders has expanded. The research team includes Drs. Bela Mittelmann and Millet as supervising analysts, Drs. James Dyde, Charles Hesselback, Margaret Strahl, and Henry B. Richardson as therapeutic investigators, with Drs. Isidor Mufson and Frederick Heath representing the Peripheral Vascular Clinic as collaborators.

Dr. Ruth Moulton has again actively participated in two research studies conducted in the School of Dental and Oral Surgery. The study on periodontal conditions with the cooperation of Professors Frank Beube and William A. Themann of the School of Dental and Oral Surgery has been somewhat extended over last year by means of one long-term study of a particularly interesting case. To complete the pilot study on hyperemesis gradivarum Dr. Easser has continued psychiatric interviews on an additional fifteen cases while they were receiving medical treatment on the obstetrical wards. Dr. Charles C. Hogan has been working with Professor Werner of the Department of Medicine on a preliminary investigation of psychosomatic illnesses following thyroidectomy.

Drs. Easser and Stewart shared the third-year undergraduate teaching of students on the medical service. Drs. Felix Hoffman and Charles Hogan supervised the third-year medical students taking electives in psychosomatic medicine.

Dr. Moulton, with the active assistance of Dr. Sidney L. Horowitz of the School of Dental and Oral Surgery, again taught a course in psychosomatic dentistry. The two courses in psychosomatic medicine for the students in physical and occupational therapy were taught this year by Dr. Stewart. Members of the Department have participated in many national and local committees and have given numerous lectures here and abroad on psychiatric problems.

SCHOOL OF PUBLIC HEALTH

Professor Harold W. Brown, Associate Dean and Director

The student body of the School of Public Health numbered approximately 130 during the 1950–1951 academic year and included students from 13 foreign countries.

Dr. Harold W. Brown, Professor of Parasitology, who has served as Acting Director of the School since November, 1947, was made Director of the School as of January 1, 1951.

The program of teaching and research in nutrition in the School is continuing to expand. The Nutrition Diagnostic Laboratory of the New York City Department of Health, located in the same building as the School of Public Health, is complete and this facility will be of great value in the teaching and research program of the School. An active Nutrition Clinic has been developed during the past year which now affords good clinic experience for both medical students and graduate students. Recently the Milbank Memorial Fund granted a three-year fellowship to Dr. Frank W. Lowenstein, who will specialize in public health aspects of nutrition during his studies at the School.

Dr. Harry S. Mustard, Executive Director of the State Charities Aid Association, and Dr. Wilson G. Smillie, Professor of Public Health and Preventive Medicine of Cornell University Medical College, have continued to give courses in public health practice. Dr. James L. Troupin, Associate Professor of Public Health Practice, resigned as of March 31, 1951, to become associated with the World Health Organization. To fill this vacancy for the coming academic year Dr. Margaret W. Barnard, Director of the Office of District Health Administration of the New York City Department of Health, has been appointed Associate Professor of Public Health Practice.

The division of hospital administration has just completed its sixth year. Twenty-eight students are starting their residency work; a total of 153 students have completed the academic year of study, and ninety-four have been awarded degrees in hospital administration. All of the graduates hold positions on the administrative level in hospitals located throughout the United States and other countries.

Among the distinguished lecturers and visitors were: Dr. Odair P. Pedroso, Professor of Hospital Organization and Administration, Faculty of Public Health, University of São Paulo, Brazil; Dr. Guillermo Almendra, Director, Hospital Obrero de Lima, Lima, Peru; Mr. Herbert N. Kruskal, Rotterdam, Holland; Mr. J. E. Pater and Dr. George Godber of the Ministry of Health, London, England; Dr. Nathaniel W. Faxon, formerly Director of the Massachusetts General Hospital and Massachusetts Eye and Ear Infirmary, Bos-

ton. Mr. John G. Steinle, Hospital Program Director of the Federal Security Agency, presented a special course on hospital construction.

Professor John E. Gorrell has been elected president for 1951–1952 of the Association of University Programs in Hospital Administration.

The research project in the epidemiology of hypertension has continued throughout the year as a cooperative effort among the staff of the School, the Bureau of Applied Social Research of Columbia University, and the Recess Commission on Hypertension of the Commonwealth of Massachusetts. Three full-time and several part-time investigators have been employed in this work at the School of Public Health. As part of the work on the hypertension problem, a symposium on essential hypertension was organized and conducted in Boston in February.

Professor E. Gurney Clark has continued participation in the study of untreated syphilis being conducted in Oslo, Norway. Professor Clark has been made a member of the Expert Advisory Panel on Venereal Infections and Treponematoses of the World Health Organization, a corresponding member of the Swedish Dermatologic Society, and an honorary member of the Société Française de Prophylaxie Sanitaire et Morale of Paris. During July and August of 1950, he served as consultant to the World Health Organization to review the endemic syphilis control program in Yugoslavia. Professor Clark is assisting in the survey of the New York City Department of Health being conducted by the American Public Health Association as part of the Mayor's Survey of New York City activities.

A distinguished visitor who lectured to the students was Dr. Thorstein Guthe, Chief of the Venereal Disease Section of the World Health Organization.

An experimental curriculum in medical care was set up under the supervision of Professor Leonard J. Goldwater. This included most of the required courses in the Master of Public Health curriculum, several hospital administration courses, and those courses in occupational health most closely related to organization and administration of industrial health programs. The curriculum also included special field work in the activities of the Hotel Trades Council and Hotel Association Health Center, the Central Manhattan Medical Group, and the Drivers and Dairy Employees Unions Pension and Welfare Fund of the Milk Industry. In addition, the curriculum will include a rotating internship following the academic program.

The following research problems, under the direction of Professor Goldwater, have been in progress during the year: the study of workmen's compensation in heart disease has been completed and accepted for publication; animal experimentation on the relationship of nutritional factors to industrial poisoning is being continued; observations on possible relationships between fatty changes in liver and bone marrow in human subjects have been com-

pleted and submitted for publication, and animal experiments on this problem have been initiated in cooperation with Professor Maurice E. Shils.

Under the direction of Professor Shils, and with the participation of Mrs. Anna C. Gelman, research has recently been begun on the possibilities of a simple ultra microbiological assay procedure for vitamins and amino acids. Professor Shils has also inaugurated a study of the effects of large amounts of methyl groups on the biochemistry of the organism.

Professor Goldwater spent two months studying industrial health practices in England, France, Holland, and Switzerland on a fellowship from the World Health Organization. He lectured at the University of Leiden and at the Faculty of Medicine in Paris. He was elected a corresponding member of the Société de Médecine et d'Hygiène du Travail of Paris.

Professor Irving R. Tabershaw made a survey of industrial hygiene conditions in the Western Zone of Germany during the fall of 1950 at the request of the High Commission for Occupied Germany. Governmental agencies and industrial plants and laboratories were visited in the American, British, and French sectors. A report was submitted embodying the evaluation of present-day services and recommendations for implementing the policies of the High Command through industrial hygiene.

Under Professor Llewellyn E. Kling public health education has continued to expand its teaching and field training facilities. Outstanding health educators from voluntary and official health agencies have participated in the teaching and have made their facilities available for field training of the students. Dr. Franklin D. Murphy, Dean of the University of Kansas School of Medicine, was a guest lecturer.

In continuing the research program in controlled fertility in North Carolina and Alabama, Professor Kling conducted a second conference in New York on the public health aspects of this subject. This research program has been conducted in cooperation with Professor John W. Fertig and is partly financed by a grant from the Planned Parenthood Federation of America.

Professor Kling resigned as of the thirtieth of June to go into public health administrative work in North Carolina. Dr. George Rosen, formerly Director of Health Education of the New York City Department of Health, has been appointed Professor of Public Health Education.

The teaching of parasitology for the graduate students in the School of Public Health has expanded during the past year, as many of the students, especially foreign students, are taking elective work in the Tropical Diseases Clinic of the New York City Department of Health, which is located in the same building as the School.

Professor Harold W. Brown and Dr. Kathleen L. Hussey have continued their investigations of the therapy of *Endamoeba histolytica*. These researches are directed toward the finding of a more effective chemotherapeutic agent

against amebiasis than is now available. Professor Brown has continued his study of filariasis. He is following the course of a number of patients whom he treated for *Wuchereria bancrofti* infections eight years ago. He is also continuing his studies on the effect of heavy metal compounds against canine filariasis.

Professor Brown and Dr. Hussey are continuing their work on the chemotherapy of enterobiasis. Mrs. Helen S. Wells has found that certain antibiotics are effective against pinworm infection in mice. These antibiotics have now been tried against pinworm infection in man with considerable success. Dr. Kam-Fai Chan has been making a study of the life cycle of the pinworm in mice, which will enable investigators to give a known number of worms to an animal. These infected animals then will serve for further chemotherapeutic studies.

Professor Roger W. Williams is conducting investigations on the influence of antibiotics and vitamins of the B complex on the growth and development of mosquitoes and has undertaken preliminary steps in a study on the relationship of the German cockroach to *E. histolytica.*

Dr. Hussey spent the summer of 1950 and will spend the summer of 1951 at the University of Michigan Biological Station, where she and Professor Lyell J. Thomas of the University of Illinois are working on the life cycle of several cestodes. This work is being supported by the United States Public Health Service.

Professor Alvin R. Jacobson inaugurated a new course of instruction for the hospital administration students dealing with the phases of sanitation which are basic and peculiar to hospitals and similar institutions. Two studies have been continued: Professor John M. Henderson's field study in Puerto Rico on the bionomics of the malaria vector, *Anopheles albimanus;* Dr. Albert J. Beckmann's study on physical and bacteriological examinations of the air in the premature wards in Babies Hospital. These studies have been supported by the United States Public Health Service.

Professor Henderson served, during the summer of 1950, as visiting consultant in sanitary science to schools of hygiene at São Paulo, Brazil, Santa Fe, Argentina, and Santiago, Chile, under the auspices of the United States Public Health Service and the United States State Department. At present Professor Henderson is on sabbatical leave serving as Sanitary Engineering Consultant with the Communicable Disease Center of the United States Public Health Service stationed at Kansas.

Professor Jacobson has been asked to serve as a consultant from June 1 to September 1, 1951, in the Virgin Islands to make a survey of the pollution of the water in principal harbors of the islands of St. Thomas and St. Croix. This study is under the auspices of the Virgin Islands Department of Health and the United States Public Health Service.

Professor Henderson is serving as Chairman of the Publications Committee, Engineering Section, American Public Health Association; Member of the Sanitary Engineering Committee, Chemical-Biological Coordination Center, National Research Council; Consultant, National Institutes of Health Research Grants Division; and Member, Tropical Medicine Study Section.

Professor John W. Fertig and the Misses Ann Baranovsky and Phyllis Buckley have given frequent advice and consultation to research workers of the Medical Center and other medical centers and of the New York City and State Health Departments. Professor Fertig has given statistical advice to a committee of the New York Academy of Medicine which is studying neonatal deaths, to a committee of the Family Health Maintenance Demonstration which is being sponsored by the Community Service Society and Montefiore Hospital, and to the Engineering Committee of the American Public Health Association. He has continued work with Dr. Neal W. Chilton of the New Jersey State Health Department in the adaptation of certain statistical techniques to dental research problems, which work is sponsored by the United States Navy.

In August and September of 1950, Professor Fertig was Visiting Professor of Biostatistics at the School of Tropical Medicine in San Juan, Puerto Rico. Sixteen scientific papers giving the results of research conducted were published during the year by members of the faculty of the School of Public Health.

DEPARTMENT OF RADIOLOGY

Professor Ross Golden, Executive Officer

Appointments were given to nine new instructors in radiology during the past year: Drs. Hugh Caumartin, Samuel Feinberg, William Klauber, Juan M. Traveras, Gerhart S. Schwarz, Frank Remy, Anthony Galgano, Robert Butz, and Myer Sharpe who finished their three-year residency and stayed on as assistant radiologists. Four of these members of the staff resigned to go into private practice: Drs. Caumartin, Feinberg, Klauber, and Butz. Dr. Emil Schnap also resigned to go into the Department of Radiology at Cornell University Medical College.

The Department has in training six clinical fellows: Dr. Georgia M. Lee, on a National Cancer Institute Fellowship; Lieutenant Colonel George F. Lull, Medical Corps, United States Army; Dr. Thomas J. Davis, on an American Cancer Society Fellowship; Dr. Reha Islam of Turkey; and Dr. Eugenia Karvouni of Greece. Dr. John R. Mitchell starts July first as a Fellow of the United States Department of Health.

The Department has entertained visiting doctors from England, Sweden,

France, New Zealand, and other foreign countries. The Wednesday X-ray conference attendants had the pleasure of hearing some of these visitors speak. Among outside guest lecturers was Dr. W. Edward Chamberlain, who spoke on cervical air myelograms and Lindblom's method of investigating lumbar intervertebral discs. Mr. William C. Stronach, Executive Secretary of the American College of Radiology, spoke on economic problems in the practice of radiology. The subjects stressed in the regular Wednesday X-ray conferences this year were the genito-urinary tract and bones. At the conferences the staff had the advantage of hearing these members of the Department of Orthopedic Surgery: Dr. Melvin B. Watkins, on low-back, Professor Halford Hallock, on the foot, and Professor W. Harrison Von Lackum, on scoliosis. Several members of the staff of the Department of Urology lectured on various problems involved in X-ray diagnosis.

Thanks to the generous help of the Damon Runyon Memorial Fund and an anonymous donor, it has been possible at last to order a long-needed experimental X-ray machine for studies on animals and cadavers. This unit will be installed on the twentieth floor of the College and will be used by members of several Medical School departments besides the Department of Radiology.

In July, 1950, Professor Golden attended the International Congress of Radiology in London as Chairman of the American Delegation, Official Delegate of the American College of Radiology, National Research Council, and as representative of Columbia University. By invitation he presented a paper before the Congress on "Advances in Gastro-enterological Radiology 1937–1950." He gave a number of other papers during the year.

Together with Professor Arthur Purdy Stout, Professor Golden gave a lecture on cancer of the stomach to the staff of Halloran Veterans Hospital in September and to the staff of the Bronx Veterans Hospital in May. He gave a refresher course on the small intestine, with Professor Lois C. Collins, at the meeting of the Radiological Society of North America in Chicago. He also gave a lecture on the same subject at the White Plains Hospital this spring. He attended the Teachers' Conference of the American College of Radiology in Chicago as representative for Columbia University and took part in a panel discussion on the G-I tract at the Bellevue Alumni Association, New York University. He continued to serve on the American Board of Radiology, on the consulting editorial boards of the *American Journal of Roentgenology* and of *General Practitioner* and continues as Editor of *Diagnostic Radiology,* published by Thomas Nelson and Sons.

Professor Golden was elected an Honorary Member of the British Institute of Radiology and Honorary Member of the Detroit Roentgen Ray and Radium Society. He was approved Chairman of the Committee on Medical Education of the Academy of Medicine, Chairman of the Committee on

International Affairs of the American College of Radiology, and member of the Subcommittee of the Joint Committee of the Hospital Association of New York State and the Medical Society of the State of New York.

The second edition of Professor John Caffey's *Pediatric X-ray Diagnosis* was published in 1950. During the year Professor Caffey gave lectures to many medical societies and groups, among which were the New York Academy of Medicine Graduate Fortnight, the New York Roentgen Society, The Buffalo Roentgen Society, the California Medical Association and the Veterans Hospital in Long Beach, California, the Intermountain Pediatric Society in Salt Lake City, and the Veterans Administration Hospital, Bronx, New York.

Professor Harold W. Jacox attended the International Congress of Radiology in London during July, 1950. After his return he was guest lecturer at the Post-Graduate Urological Convention and later was guest speaker at the New England Roentgen Ray meeting where he spoke on "Radiation Effects on Adult Bone." He attended other medical meetings such as the annual American Roentgen Ray Society meeting in St. Louis and the Radiological Society of North America meeting in Chicago, where he discussed various papers which were presented. He lectured before the Central New York Roentgen Ray Society and the Pittsburgh Radiological Society and also gave a three-hour postgraduate lecture on "Radiotherapy of Carcinoma of the Mouth" for dentists of the New Jersey State Department of Health and the New Jersey State Dental Society.

The radiotherapy division of the Radiological Service of Presbyterian Hospital moved into its new quarters in July, 1950. A full-time physicist was employed for the purpose of calculating tumor doses in routine treatment plans for both X-ray and radium cases and for developing new methods for adequate treatment and for teaching residents the physical basis of radiotherapy. This has proved of considerable benefit to the Department.

Work in the Tumor Chemotherapy Department has been carried on chiefly by members of the radiological service. At present forty-four cases who received Thiethylenemelamine are being analyzed in conjunction with Professor Alfred Gellhorn and Dr. Israli A. Jaffe. Experimental work on the effect of ACTH and cortisone on radiation erythema of the skin was begun during the past year.

One hundred cases of tumor of the urinary bladder treated with radium were reviewed by Dr. Morton M. Kligerman and results and technique were discussed. To date a total of 198 similar cases have been analyzed, and Dr. Samuel P. Marshall of the Department of Urology has reviewed 127 comparable cases treated by segmental resection.

The construction of the rotation therapy unit, which was designed early in 1950 for the Department, has been carried out. The unit was delivered in April and the dedication of this Howard V. Long Rotation Therapy Unit

took place on May 14, 1951. The greater part of the cost of this project was borne by the Damon Runyon Memorial Fund. The acquisition of the unit has opened the way to improved treatment of patients with deep-seated lesions.

In September Dr. Kligerman, together with Dr. Raymond F. Healey, attended the course on effects of atomic weapons at Brookhaven National Laboratories. Dr. Kligerman has also lectured to a group of the Radiological Research Laboratory on the general principles of radiotherapy and has given a talk on the diagnosis of syphilis by X ray to the Department of Dermatology and another on radiation injuries to the staff of the Adelphi Hospital.

Dr. Vincent P. Collins was promoted from Assistant to Associate Professor of Radiology and has resigned as Assistant Radiologist at Presbyterian Hospital to become Chief of the Radiotherapy Division of the new Francis Delafield Hospital.

In addition to his usual teaching schedule, Professor Ernest H. Wood this year continued the series of ten formal lectures to fourth-year students which was added to his program for the first time last year. A series of ten formal lectures in diagnostic neuroroentgenology was given during the Winter Session, also by Professor Wood. The series was attended by a class of forty-seven graduate physicians engaged in the practice of neuropsychiatry and by the resident staff in neurology and neurosurgery.

In September Professor Wood was invited to be a member of a panel for the discussion of herniated lumbar vertebral discs at the annual meeting of the Neurosurgical Society of America at Sea Island, Georgia, and in December he participated in a round-table discussion on "Radiology in Relation to Compensation Medicine" at the New York University Post-Graduate Medical School. He presented a paper entitled "Intraspinal Lesions Producing Encroachment on the Intervertebral Foramen" at the monthly meeting of the New York Roentgen Society. For the scientific program of the annual meeting of the former residents of Neurological Institute in December, an exhibit on myelography was presented. Professor Wood and Dr. Schnap arranged an exhibit on "The Roentgenologic Diagnosis of Diseases of the Spinal Cord and Spinal Nerve Roots" for the annual meeting of the American Roentgen Ray Society in St. Louis in September.

The Radiological Research Laboratory is now occupying its new quarters in the cancer research laboratories on the eleventh floor of the Medical School. The new laboratory is a great improvement over the restricted and badly overcrowded quarters occupied heretofore. It will permit a reasonable expansion of its activities, but above all it makes possible the permanent setting up of facilities that in the past have been either completely lacking or inadequate. Most of the special equipment has been provided by the Atomic Energy Commission.

The work has continued along the lines described in previous reports. The research project for the Atomic Energy Commission has been continued and also the problems allied with therapeutic radiology and with medical uses of radioactive isotopes. The Atomic Energy Commission project consists of two parts: research in radiological physics and research in radiobiology. The personnel paid by the A.E.C. consists of nineteen persons on the scientific staff and thirteen on the technical and clerical staff, either on a full- or a part-time basis.

During the past year Professor G. Failla spent most of his time in directing the work of the A.E.C. project. He is a consultant to several of the A.E.C. installations and to the Armed Forces Special Weapons Project. He is chairman or member of various committees dealing with radiobiological research, radiological instrumentation, medical applications of radioactive isotopes, and with protection of personnel from ionizing radiations.

Professor Edith H. Quimby's work has been devoted mainly to clinical and research problems in connection with X rays, radium, and radioactive isotopes. She is a member of the Atomic Energy Commission's Advisory Committee on Isotope Distribution and of the National Committee on Radiation Protection and is a consultant for the National Research Council, the American Medical Association, and the Veterans Administration.

In addition to consultations on new work on radioactive isotopes, Professor Quimby has continued her active collaboration with the three groups using radioactive isotopes clinically—Professor Virginia K. Frantz of the Department of Surgery and the surgical group, in connection with thyroid cancer; Professor Werner, in diagnosis and treatment of toxic goiter; and Professor Jacox and Dr. Kligerman, in treatment of leukemia and polycythemia. Also with Professor Werner, studies on thyroid function are being carried out. The work with thyroid cancer has been supported by grants from the American Cancer Society and the Edith M. Schweckendieck Fund; that on thyroid function by grants from the United States Public Health Service and the Atomic Energy Commission.

Professors Failla and Quimby continue to be members of the Subcommittee of the Joint Committee on Graduate Instruction for work in biophysics. Several courses have been offered for the students in this field, as well as in radiology, by Professors Failla, Quimby, Roberts Rugh, and Harald H. Rossi. One student has completed experimental work in the Department for his doctoral thesis, another has commenced hers.

With the increasing use of radioactive substances, it has become desirable to establish a committee in the Medical School to examine clinical research projects in this field before they are initiated, as well as to supply the required liaison with the Atomic Energy Commission. Professor Failla is Chairman of this committee and Professor Quimby is a member. They have been consulted

by research workers from several different departments and have assisted in setting up several new investigations.

Professor Rugh has been occupied principally with the general supervision of radiobiological research on the Atomic Energy Commission project and related problems. He has taken an active part in the civil defense program for the city of New York.

Professor Rossi has been largely responsible for supervision of the design, construction, and setting up of the new laboratory. He has conducted and supervised research in the measurement of neutron doses and allied problems in the Atomic Energy Commission project. He is also supervising two doctoral theses. Professor Rossi has collaborated with Dr. Samuel R. Powers and Professor Emanuel M. Papper of the Department of Surgery in the development of an instrument for the measurement of cardiac output employing radioactive isotopes.

Professor Failla was a delegate to the Sixth International Congress of Radiology in London in July, 1950, and Professors Quimby and Rugh also attended the meetings. Professor Quimby was an invited speaker at one of the general sessions, her topic being "Achievement in Radiation Dosimetry, 1937–1950." Professors Failla and Rugh attended the International Cancer Congress in Paris in July and Professor Rugh also attended the Sixth International Sex Congress at Oxford. In May, Professor Quimby gave the first James T. Case lectures in radiology at Northwestern Medical School. Professors Failla, Quimby, Rugh, and Rossi have appeared on the programs of national and local radiological and other scientific societies and have given a number of other lectures to medical and lay audiences, many of these having been on topics connected with the applications of atomic energy to medical or biological research. They have all been actively concerned with training for civilian defense. Several papers have been published during the year by members of the staff and several others are awaiting publication.

DEPARTMENT OF SURGERY

Professor George H. Humphreys II, Executive Officer

The past year has seen a continuation of the adjustments within the Department to improvements in physical facilities both in the Hospital and in the Medical School, the full benefits of which are just beginning to be realized. On February first the Francis Delafield Hospital for cancer was opened at the Medical Center, adding a valuable facility for teaching and research in this important field, and also, since its surgical service is staffed entirely by members of this Department, adding a considerable load to the clinical responsibilities. In January, the twelfth and fourteenth floors of the

Cancer Institute wing of the Medical School were opened. These, with additional facilities on the fifteenth floor of the Institute and new laboratories in the west wing of the seventeenth floor of the Medical School, which are not yet ready for use, will add considerably to the research effectiveness of the Department. Finally, the reconstruction of the operating rooms and anesthesia area on the eighteenth floor of the Hospital was completed on March first. When adequately staffed, these new facilities will substantially relieve the crowded and difficult conditions which have prevailed during the reconstruction period and not only will improve conditions for clinical instruction in the operating rooms, but also will provide laboratory space in the anesthesia wing for investigative work.

Major changes in staff have been few. On June 30, 1951, Professor Arthur Purdy Stout retired from the Department to take up his new duties as Professor of Pathology and Pathologist to the Delafield Hospital. Professor Stout's contributions in his thirty-seven years of service as a member of the Department have been incalculable. As a pioneer in the correlation of meticulous pathological study of tissues removed at operation with the treatment administered and the subsequent course of the patient, he followed the principles initiated by Dr. William Clarke, founder of the laboratory, and developed them into a special field in which he has become an internationally recognized authority. Always an indefatigably enthusiastic teacher, he attracted to the laboratory large numbers of graduate students from many countries.

Since publication of his textbook on human cancer, he has gained wide recognition in this field and was in constant demand for consultations and outside speaking engagements and by committees interested in cancer research. In recognition of these contributions he was awarded the Bronze Medal for Distinguished Service in Cancer Control by the American Cancer Society on April 20, 1951. It is fortunate that with his retirement from active service in the Department his services to the University will continue not only in the Delafield Hospital, but also as Consultant in surgical pathology in the Presbyterian Hospital. His place cannot be filled, but his duties will be ably carried on by Professors Raffaele Lattes and Virginia Kneeland Frantz.

On January 1, 1951, Dr. Joseph MacDonald returned from Beirut, Lebanon, where he had served as Professor of Surgery at the American University since his completion of the surgical residency at the Medical Center in 1946, to the position of Professor of Surgery and Director of the Surgical Service of Delafield Hospital. His appointment adds to the Department not only a clinician of wide experience and exceptional ability, but also an able teacher who will make the surgical wards of the new hospital a valuable addition to the facilities of the Department.

On July 1, 1950, Assistant Professors David V. Habif and Ralph A. Deterling were promoted to Associate Professors, and Drs. Henry T. Randall and Ferdinand F. MacAllister were promoted from Instructors to Assistant Professors. These four men this year formed the central core of the full-time staff. On the part-time staff, Dr. Thomas W. Stevenson was promoted to Associate Professor of Clinical Surgery and Drs. Herbert C. Maier and Robert Wylie, both of whom work on the Columbia Service at Bellevue Hospital as well as at the Medical Center, were promoted to Assistant Professors of Clinical Surgery on July 1, 1950. On the same date Dr. Frank L. Meleney was promoted to Professor of Clinical Surgery.

A major change, the full effect of which will not be felt until next year, was also made in the undergraduate teaching program. For some years it had been felt that the clinical clerkship on the surgical wards would be a more effective teaching experience in the fourth year, after basic clinical training in the third-year clerkship on the medical wards, than when given in the third year, often before the medical clerkship. Beginning with the next academic year, undergraduate teaching in the third year will be confined to a shorter period of introduction to basic surgical problems under the guidance of preceptors in the clinics and on the anesthesia and fracture services, after which a concentrated clerkship, unhampered by didactic exercises, will be initiated on the wards in the fourth year.

In the laboratories, in spite of the dislocations related to the building program and the increasing difficulties of finding adequate financial support, productivity has continued at a high level. The current year has marked an important milestone in the history of the laboratory of surgical pathology. In January it left the quarters which it had occupied ever since the present Medical Center opened in March, 1928. The new laboratory of surgical pathology on the fourteenth floor of the new Institute of Cancer Research is a commodious group of rooms admirably adapted for its increased activities and larger staff of workers. Some idea of the growth of laboratory activities can be gained by comparing the number of human specimens examined during the first full year in the present Medical Center, i.e., April 1, 1928, to March 31, 1929, with the most recent comparable year April 1, 1950, to March 31, 1951. During the earlier period there were 2,868 specimens examined, 2,759 from the hospital and 109 from outside sources. During the year just passed there were 7,950—5,563 from the hospital and 2,387 from outside sources. The group of graduate surgeons and pathologists was greatly reduced in numbers during 1951 as a result of the mobilization of physicians, and it is anticipated that this state of affairs will continue during the coming year.

In February, 1951, the laboratory for cell physiology, directed by Profes-

sor Margaret R. Murray, was transferred from its former cramped quarters on the sixteenth floor of the College to a roomier and better equipped installation on the fourth floor of the cancer research wing, where its work is now proceeding with much greater comfort and efficiency.

In collaboration with Professor J. Lawrence Pool of the Department of Neurological Surgery and Dr. Edith R. Peterson, metabolic and chemotherapeutic studies are being made on human glioblastomas and normal fetal brain tissues in vitro. This work, which has been supported by the John Gunther, Jr., Memorial Fund, is designed as a step toward the clinical application of metabolic and chemotherapeutic findings by other workers on transmissible animal tumors. We are indebted to Professors Edward L. Howes and Alfred Gellhorn and their associates for valuable cooperation in this enterprise.

With Professor Erwin Chargaff of the Department of Biochemistry and Miss Helena H. deLam, investigation of the mechanics of the action of mitotic poisons has continued; among these are the vesicant protoanemonine, kindly supplied by Professor Beatrice Seegal of the Department of Bacteriology, and aminopterin, one of the folic-acid antagonists. This work has been supported by the American Cancer Society, Inc., and the Damon Runyon Memorial Fund.

In collaboration with Professor G. Failla and Mrs. Failla of the Department of Radiology, Professor Murray has begun experiments to determine the influence of anoxia upon the extent of radiation damage (using cells in vitro), and with Professor Stout and Dr. Irene A. Pogogeff she has continued to study and record the characteristics exhibited by a variety of human neoplasms in tissue culture, as an aid in their classification and diagnosis.

Miss Gertrude Kopech has completed the project, undertaken three years ago, of compiling a comprehensive bibliography of the research in tissue culture. The undertaking has been subsidized by the American Cancer Society, the Lederle Laboratories, Eli Lilly and Company, CIBA Pharmaceutical Products, and the United States Public Health Service. Dr. Kamal J. Ranadive, Rockefeller Fellow from Bombay, India, spent three months in the laboratory as a part of her preparation to undertake a tissue culture study of mammary cancer with Dr. Khanolkar at the Tata Memorial Hospital.

During the past year fifty patients were admitted to the Surgical Metabolic Unit for study under the direction of Professor Henry T. Randall and his associates. Studies have been continued on the effects of caloric intake, both oral and parenteral, on nitrogen balance pre- and postoperative. These patients are being studied from the point of view of sodium and water balance and for the effects of albumin, mercurial diuretics, serum electro-

lyte levels, and paracenteses on water and electrolyte balance. It is felt that the special dietary care possible in the unit contributes greatly to the successful outcome of these procedures.

Fifteen patients with thyroid disease, most of these thyroid toxicosis, have been studied to evaluate the effect of thyroid stimulating hormone, ACTH, cortisone and thyroid extract on the radioactive iodine uptake, serum iodine level, and nitrogen and electrolyte balance. Seven patients were studied in complete balance and the remainder as partial studies.

Three particularly interesting and difficult electrolyte and nutritional problems were transferred from the general ward service during the year for management. Twenty-four hundred blood volume studies have now been done, and the data from various types of major surgical problems are being analyzed for publication to illustrate the deficiencies in blood volume found in these cases and the efficacy of preoperative blood volume deficit replacement. Dr. Douglas Tompkins, who has done much of the work with this technique, is preparing this paper with Professor Randall's assistance. Drs. Douglas B. Stevens, Thomson Bryant, McLemore Bouchelle, and William Larsen have set up and developed the technique of total body water measurements utilizing heavy water. Mr. Roy McKittrick and Dr. Malcolm Plum with Dr. Herbert Fredell from Cooperstown set up and conducted the inulin and PAH studies with the assistance of Miss Rita Lipton. Support of this work has been continued by a grant from the United States Public Health Service.

In the surgical bacteriology laboratory bacitracin research and laboratory studies in connection with the clinical projects have continued under the direction of Professor Frank L. Meleney. In addition to the work in this laboratory, the chemical nature of bacitracin is being investigated in the Department of Biochemistry under the direction of Professor Hans T. Clarke. Studies on the efficacy of terramycin in the treatment of surgical infections in ambulatory patients were carried out in the surgical clinics with the cooperation of Dr. James Bougas and Dr. Alfred Young.

A project on the efficacy of terramycin ointment in the treatment of pyogenic infections of the skin has been carried out in cooperation with Professor J. Lowry Miller of the Department of Dermatology. An exhibit reviewing the results of local treatment of pyogenic infections of the skin with penicillin, bacitracin, dihydrostreptomycin, and terramycin was presented to the meeting of the American Medical Association at Atlantic City in June.

The Department of Surgery has cooperated with Professor Edmund P. Fowler, Jr., of the Department of Otolaryngology in a study of the bacterial flora of normal and infected ear canals. Surgical interns have been assigned to the laboratory for a training period of two months. The necessity of

culturing surgical infections and determining the sensitivities of the strains in the bacterial flora to the available antibiotics has been emphasized as the basis for intelligent antibiotic therapy. The surgical bacteriology laboratory has continued to supply bacitracin for parenteral use and bacitracin solutions and ointments for local therapy without charge to all departments in the Medical Center. The bacitracin is a gift from the Commercial Solvents Corporation, Charles Pfizer and Company, and S. B. Penick and Company.

Although carrying an increasingly heavy load of work for our own and other departments, the experimental surgery operating room has been unable to increase its personnel due to financial restrictions. Much credit is due to Miss Daisy Mapes and her assistants on whom the load falls most heavily. Over five hundred operations were performed during the year, of which approximately one hundred and fifty were done in connection with teaching or research projects of other departments, including Medicine, Urology, Orthopedic Surgery, Obstetrics and Gynecology, Neurological Surgery, and Otolaryngology.

Professor Ralph A. Deterling in association with Dr. Mary Parshley and Dr. Claude C. Coleman continued to explore the various methods of preserving vascular grafts in nutrient solutions and by freezing. Studies of the grafts were made during storage or after implantation by aortograms, gross and microscopic preparations, histochemistry, and tissue culture. Professor Deterling and his associates also studied the cardiovascular alterations occurring as a result of intra-aortic injection of the contrast media used clinically.

Also in the field of cardiovascular surgery, Professor Ferdinand McAllister has continued his studies on prevention of myocardial infarction following occlusion of coronary arteries in dogs by means of a venous graft between aorta and coronary sinus. These studies were begun in Cleveland by Professor McAllister, in association with Dr. Claude Beck, during his leave of absence a year ago. In addition Dr. Arthur Voorhees, under the direction of Professor Arthur Blakemore, began a promising series of experiments on the development of prosthetic arterial grafts by the use of plastic cloth tubes. Also in cooperation with Professors Blakemore, Emanuel Papper, and other members of the Department, a series of studies was begun by Drs. Hugh Fitzpatrick and Sanford Weissman of the resident staff, both on animals and on patients undergoing operation.

The joint project of the Departments of Medicine and Psychiatry on ulcerative colitis has continued with Dr. Robert Hiatt the surgical member of the group. Professor George B. Koelle of the Department of Pharmacology has assisted the group in determination of cholinesterase levels of normal and diseased bowel.

Professor Cushman D. Haagensen's work on the mouse mammary carci-

noma virus has continued. During the past year this project has been directed primarily towards antibody and immunization studies in rabbits, in cooperation with Professor Michael Heidelberger of the Department of Medicine and Professor Samuel Graff of the Department of Obstetrics and Gynecology.

Professor Virginia Kneeland Frantz, in conjunction with clinicians of the thyroid group from the Departments of Surgery, Medicine, and Radiology, has continued her studies on the use of radioactive iodine as a therapeutic agent in metastatic thyroid carcinoma. Since 1944 thirty-six patients have been treated, eleven of whom are still under treatment, which appears to be more effective than any other to control pain and the spread of the disease. In addition tracer doses are given to patients prior to operation for possible thyroid cancer, as a result of which 440 radioautographs of surgical specimens have been obtained.

Dr. Edmund Goodman has continued his work on the electrogastrogram. Professor Howes has continued his studies on the effects of chemical agents and ACTH on cell growth following injury. In addition, he has collaborated with Dr. John D. MacLennon in a study of the effects of collagen-dissolving enzymes of bacterial origin, developed by Dr. MacLennon the previous year.

Dr. Robert Grinnell has continued his painstaking studies of the spread of cancer originating in the large bowel. Professors Harold D. Harvey and Fordyce B. St. John, with the assistance of Miss Rita Pinney, have begun an extensive review of the results of gastric resection, both for carcinoma and gastric ulcer. Professor David V. Habif, in addition to taking part in the metabolism service, has taken up the administrative duties of the laboratory and the guidance of research projects conducted by the resident staff, formerly carried out by the late Professor John S. Lockwood. In the latter field there has been much activity. Ten members of the assistant resident staff have taken active part in experimental work during the year. This work includes that already mentioned on circulatory dynamics by Drs. Fitzpatrick and Weissman, as well as a related project initiated by Dr. Samuel Powers. Dr. J. Wallace Blunt, Jr., has continued his work in histochemistry with Professor Howes and Professor Stephen S. Hudack of the Department of Orthopedic Surgery. Dr. Herbert Volk has begun a study in cooperation with Professor Duncan A. Holaday of the anesthesia service and Dr. Julian Mandell of the Department of Radiology on the development of an apparatus for studying electrical potentials in the small bowel. Studies of methods of control of blood clotting have continued under Professor Habif's guidance by several members of the assistant resident staff.

This manifold activity has been possible only by generous support from special funds contributed to the Department and by numerous grants from foundations, commercial concerns, medical societies, governmental agencies,

and gifts from individuals. The former include the Fund for Blood Vessel Surgery, the Surgical Bacteriology Fund, the Carola Rothschild Fund, the Edith M. Schweckendieck Trust, the Leggett and Waters Fund, the Fluegge-Fischer Fund, and the Surgical Research Fund. The latter group includes grants from the New York City Cancer Committee, the Damon Runyon Memorial Fund, the American Trudeau Society, The Abbott Laboratories, E. R. Squibb and Company, Wyeth, Inc., Commercial Solvents Corporation, S. B. Penick and Company, and, in addition, individual gifts from Mr. Charles Wrightsman, Mrs. James Talbot, and Mrs. Bertha Robinson. Substantial grants from the United States Public Health Service were made for four research projects, and two large grants were made by the United States Army. Grateful acknowledgment is given for these gifts and grants.

During the past year the organization and scope of activity of the Anesthesia Service, not only in the clinical service but also in teaching and research, has developed under the able direction of Professor Emanuel Papper to the point at which separate departmental status appears justified. New appointments to the staff of the Anesthesia Service are those of Drs. Edgar C. Hanks, Frederick W. Hehre, and Harvey Hatchfield as Instructors in Anesthesia. Dr. Alfred W. Safian assumed charge of the Anesthesia Service at the Francis Delafield Hospital on February 15, 1951.

Professor Papper was elected General Chairman of the Post-Graduate Assembly in Anesthesiology. He was also appointed to several state and national committees in anesthesiology. He was appointed Correspondent for *Excerpta Medica* and a Corresponding Editor for the Italian Society of Anesthesiologists.

Professor Virginia Apgar was elected President of the Board of Governors of the American College of Anesthesiologists. Professor Daniel P. Tausig was appointed to membership on the Anesthesia Study Commission of the New York County Medical Society. He also received an appointment to the Survey Committee for this area of the American Board of Anesthesiologists. Dr. Thomas F. McDermott was appointed Editor of the organ published by the New York State Society of Anesthesiologists. He was also appointed to membership on the Joint Council of the New York State Society of Anesthesiologists and was elected Chairman of the Advisory Committee in Anesthesiology of the Civil Defense Program of the State of New York. During the academic year scientific papers were presented by members of the anesthesia staff on nineteen different occasions. Under the direction of Professor Holaday, a small laboratory assigned to the Anesthesia Service in the College was developed and equipped with the aid of a generous gift from Mr. Charles B. Wrightsman.

Professor Holaday, in collaboration with Dr. Volk and Dr. Mandell of the Department of Radiology, is developing methods for obtaining direct current

recordings of electrical activity in the small intestine. Since the determination of oxygen and carbon dioxide content in blood in the presence of anesthetic agents has been a difficult procedure, Professor Holaday has been engaged in the development of modifications of previous methods to make possible the precise, rapid determination of carbon dioxide-oxygen in the presence of inhalation anesthetic agents. Three residents on the Anesthesia Service have worked on various problems under the direction of Professor Holaday.

Studies of cardiovascular function during anesthesia and operation, a broad program which involves collaboration on several different phases with various members of the Department and the Anesthesia Service, have been initiated. In addition to the extensive intravascular pressure measurements which have been made by Dr. Fitzpatrick in patients with various types of cardiocirculatory disorders, Dr. Dorothy Y. C. Ma has observed approximately thirty patients with "medical" disorders of the circulation.

Professors Papper and Holaday, with Dr. Ma, have been interested in studying the efficiency of oxygènation and the detection of carbon dioxide accumulation. Professor Holaday and Dr. Volk and Dr. Mandell of the Department of Radiology have continued their investigations into the electrical activity of the small intestine. Studies are in progress on excised segments of gut to test further the apparent immunity to effect by drugs acting on cholinergic systems and also to study the effect of general and local anesthetic drugs upon these electrical waves.

Preliminary studies have been made by Professor Holaday and Drs. Volk and Mandell on the human small intestine. For the most part patients with functional ileostomies have been studied. Drs. M. Jack Frumin and Shih-hsun Ngai have collaborated with Professor Shih-Chun Wang of the Department of Physiology in a study of the functional organization and localization of respiratory centers in decerebrate cats. Studies on the peripheral circulatory action of some vasodepressor amines begun previously were continued by Drs. Ngai and Frumin in collaboration with Professor Wang. The effects of epinephrine, nor-epinephrine, and desoxyephedrine administered intra-arterially on the blood flow to the hind limb of dogs were studied with the recording flowmeter. A summary of this work was presented to the Federated Societies for Experimental Biology in Cleveland.

Studies on heat regulation during anesthesia which had been started earlier by Professor Papper and Dr. Frumin were carried on to the completion of the first stage with the advice of Professor Richard Day of the Department of Pediatrics and Professor Robert C. Darling of the Department of Medicine.

As part of the problem in reducing neonatal mortality, Professor Apgar has engaged in the study of the transmission of certain potent narcotics and anesthetic agents across the placenta to the newborn. The first of the compounds studied has been meperidine (Demerol). In collaboration with Dr.

Bernard B. Brodie and Dr. John Burns of the Research Division at the Goldwater Memorial Hospital, Professor Apgar has shown that meperidine is transferred across the placental barrier in fairly large quantities. Dr. Alfred R. Wollack of the resident staff of the Anesthesia Service has engaged in a clinical pharmacological study of meperidine in collaboration with Drs. Bernard B. Brodie and John Burns of the Goldwater Memorial Hospital. Studies designed to gather further information on this problem are in progress on the patients at the Neurological Institute, the Francis Delafield Hospital, and, in the very near future, with the collaboration of Dr. Philip A. Lief, at the Montefiore Hospital.

Studies on hepatic and renal function during anesthesia and operation by Professor Stanley E. Bradley of the Department of Medicine and Professors Habif and Papper have been continued. Approximately forty-five experiments have been completed.

In addition to the activities of the Department at the Medical Center, the affiliated services at Bellevue Hospital under Professor Frank B. Berry and at Mary Imogene Bassett Hospital in Cooperstown, New York, under Professor Monroe A. McIver have continued their valuable work. Both of these hospitals not only teach undergraduates in surgery during elective periods, but also are closely coordinated with graduate training at Presbyterian Hospital through regular exchange programs on the assistant resident level. The affiliated services at Roosevelt and St. Luke's hospitals have continued their elective undergraduate teaching, and postgraduate teaching has been active in the affiliated services at Mount Sinai and Montefiore. In the latter hospital the surgical service was greatly strengthened during the past year by the appointment of Dr. Elliott S. Hurwitt as full-time surgical director with the title of Clinical Professor of Surgery.

Members of the Department attended more than one hundred medical meetings out of town, including 15 in foreign countries. Over one hundred papers were read and 63 papers were published. A second edition of *Introduction to Surgery* by Professors Frantz and Harvey was published, as was a monograph on "Carcinoma of the Breast" by Professor Haagensen. A magnificent book by Mrs. Martha Teach Gnudi and Professor Jerome P. Webster, *The Life and Times of Gaspare Tagliacozzi,* was published, culminating many years of painstaking and scholarly research by the authors. In March of this year Professor George H. Humphreys and Professor Magnus Gregersen, of the Department of Physiology, were asked by the Faculty of Medicine to visit the National Taiwan University Medical School at Taipeh, Formosa, as special consultants to the Economic Cooperation Administration, in order to make recommendations to the Faculty as to the feasibility of establishing a working arrangement with that medical school under the auspices of the ECA, as had been requested by that agency.

Their recommendations were embodied in a report which was accepted by the Faculty in May and forwarded to Washington, where final decision is still pending.

Honors were awarded to Professor Stout, who received the Cancer Society Medal, and to Professor Webster, who received the Greek Medal of Outstanding Deeds. Professor Stout was also made a consultant to the Walter Reed Hospital, Washington, D.C., and honorary member of the James Ewing Society. Professor Webster was made honorary member of the community of Polydrosos, Greece. Professor William Barclay Parsons was elected President of the New York Academy of Medicine; Professor Humphreys was elected President of the New York Society for Cardiovascular Surgery; Professor Robert H. Wylie was elected Secretary of the New York Surgical Society; and Professor Howes was appointed Visiting Professor of Surgery in Consultant Status to Howard University, Washington, D.C.

DEPARTMENT OF UROLOGY

Professor George F. Cahill, Executive Officer

The Department reports the appointment of Dr. Perry B. Hudson as Associate in Urology, having been formerly a member of the Urological Faculty of the Johns Hopkins University School of Medicine. He has been awarded a Damon Runyon Senior Clinical Research Fellowship. Dr. John M. Reiner, formerly of the faculty of Tufts College Medical School, has been appointed Assistant Professor of Biochemistry, assigned to Urology, for research in cancer.

The undergraduate curriculum has functioned within the contracted schedule established in 1949. There have been difficulties in organizing a program to cover the subject adequately within the time allotted, and it has been necessary to establish a thesis-type examination in order to assure a sufficient reading within the specialty.

Due to the changes within the residency staff caused by the demands of the Armed Services, considerable shifting of work and appointments has resulted. The residency of Dr. James C. Monteith was interrupted, and he is at present on active duty in the Air Force. Dr. Richard M. Carlin was also notified of his call to the Armed Services but was allowed a postponement until July 1, 1951. The departure of Dr. Monteith interrupted the investigation on chemical solution of stones which had been carried on with Dr. Samuel Raymond of the Department of Bacteriology. Dr. Noble S. R. Maluf has been active in the investigation of the value of aortography in urology in association with Professor Ralph A. Deterling, Jr., of the Department of Surgery. He also has been interested in developing technical improvements in the procedure.

Professor John N. Robinson has continued his work on male sterility with Professor Earl T. Engle of the Department of Obstetrics and Gynecology. Dr. John K. Lattimer has continued his studies, started while he was in the service and carried on in the Veterans Administration, on renal and genital tuberculosis. He has compiled a late report on the therapy of this disease with the newer techniques.

Professor Meyer M. Melicow completed his studies on "Non-Epithelial Tumors of the Urinary Tract," including tables of classification of such neoplasms, reported at the New York Academy of Medicine. At the Clinical Society of Genito-urinary Surgeons he reported on allergic granulomas of the prostate gland and on malaplakia of the urinary bladder. He also reported on the classification of tumors of the prostate and on a histological study of vesical urothelium intervening between gross neoplasms in total cystectomy. He has set up a study on the grossly normal bladder mucosa with serial sections of the areas between tumors in all total cystectomies. He has been experimenting on special stain studies of the lipoid and glycogen content of tumors of the kidney. He is carrying through a study of carcinoma of the seminal vesicles as compared with malignancies of the prostate and also a special study on tumor of the ureter.

Dr. Perry B. Hudson has been working on the enzymology and metabolism of neoplastic tissues of the urinary tract. He reported on the initial results of clinical surgical studies upon prostate cancer and summarized the same in a report to the annual Damon Runyon Seminar. With Professor Reiner, Dr. Hudson has directly supervised the opening of the Urological Research Laboratories in the Francis Delafield Hospital. An investigation on synthetic enzymes and prostatic tissue phosphatase is in progress. Dr. Hudson and Professor Reiner have been awarded a contract by the United States Atomic Energy Commission to conduct a series of experiments on phosphorous and protein turnover in genitourinary organs. This work is to be carried out in the laboratories assigned to the Department on the fifteenth floor of the Medical School. Dr. John A. Hopkins has been working with Dr. Hudson on carcinoma of the penis and on secondary tumors of the urinary tract. Dr. Alex L. Finkle completed a study on the histopathology of the renal lesion of lower nephron nephrosis and was awarded the first prize for research by resident urologists by the Urology Section of the New York Academy of Medicine.

Dr. Harry Seneca has continued his studies on the in vitro biosynthesis of cortisone from desoxycorticosterone and other steroids by the adrenal cortex. The enzyme necessary for the biosynthesis of cortisone is being studied by maintaining the adrenal cortex in cellophane sacs of the Seneca-Graff apparatus. Dr. Seneca has completed a study on the maintenance and purification of *E. histolytica* culture in cellophane sacs. He has also studied

the bactericidal properties of certain iodine compounds and H.S. (diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride monohydrate) on bacteria, especially those producing genitourinary infections.

He has undertaken a study of the effect of various steroids on pregnancy in the rat, especially the resorption of the embryo by the effect of testosterone and the lesser resorption by estradiol benzoate, estradiol dipropionate, and potassium estrone sulfate. He has also experimented with the effect of the sperm of the rat on the ovum in cellophane sac cultures and has made studies on maintenance of the fertilized ovum in cultures. In addition to publication of material on the above he contributed chapters to Pullen's *Communicable Diseases* and to Gradwohl's *Clinical Tropical Medicine.*

Professor Cahill continued his interest in adrenal surgical problems and participated in the cancer conference in Jacksonville, Florida, presenting papers at the Southeastern Section of Urology and the North Central Section of Urology.

MEDICAL LIBRARY*

Professor Thomas P. Fleming, Medical Librarian

Last year it was pointed out that new sources of income would have to be found in order to maintain the present level of literature, resources, and service. During the year this problem was studied by the Library Committee and a report presented to the Committee on Administration of the Faculty of Medicine, but no practical solution was found. The number of journals subscribed to was maintained only by selling second copies of journals which the Library possessed. We can no longer continue to do this. During the coming year the Library will reluctantly reduce its program to fit the funds that are available.

The Reading Room maintained by the School of Public Health has been discontinued and the collection of some two thousand volumes was incorporated, where needed, with that of the Medical Library. The size of the collection of the Medical Library is approximately 165,000 volumes. The number of journals currently received is 1,842.

Orientation lectures on the use of the literature were given by the Library staff to the incoming students of nursing, occupational therapy and physical therapy, and to the Social Service staff in the Hospital. Professor Fleming gave three lectures to the graduate students in the School of Public Health on the use of the literature of public health, lectured to the medical and dental students on the literature of anatomy, and taught courses in science

* For complete report see the Report of the Director of Libraries, Columbia University.

librarianship at the School of Library Service during the Spring and Summer sessions. The Library served as the laboratory for the course in medical librarianship attended by eighteen students, three of whom were from foreign countries.

The Library continues to benefit by gifts of publications from its many friends. Some of the outstanding gifts have been received from Dr. Richard B. Duane, Jr., who presented the 1,046 volume library of the late Dr. Joseph Collins. From Dr. Horatio B. Williams, Dalton Professor Emeritus of Physiology, the Library continues to receive the current issues of a number of physical and mathematical journals. From Dr. William J. Gies, Professor of Biological Chemistry, Retired, we received hundreds of current journals. Professor Jerome P. Webster of the Department of Surgery continues to develop the collection of the Library of Plastic Surgery. During the year he contributed some $900 toward its support. The continued generosity of faculty, alumni, and friends makes it possible for us to provide publications which otherwise would not be available.

Professor Fleming served as Chairman of the New York Regional Group of the Medical Library Association and read a paper on "New Indexing and Abstracting Services in the Medical Sciences" before the group at its spring meeting. He served as a member of various national committees appointed by the Association of Research Libraries, Association of College and Reference Libraries, American Library Association, and the Medical Library Association. He continued to serve as Supervising Librarian of the eight Columbia libraries of the medical-natural science fields.

In January, 1951, Dr. Tin-an Hu, formerly Professor and President of the National Kiangsu Medical College and latterly General Secretary of the Research Institute of Preventive Medicine in China, was appointed a research scholar at Columbia University under the State Department's grant-in-aid program for Chinese research scholars. Under the supervision of Professor Fleming, Dr. Hu has been engaged in calendaring the late Dr. Ralph G. Mills' collection of materials on Acupuncture and Moxa, which are ancient Chinese methods of treatment used as traditional medicine in China and later in Japan and Korea. Under the joint supervision of Professor Fleming and Professor L. Carrington Goodrich, Department of Chinese and Japanese, Dr. Hu has been extending the work of Dr. Mills, preparatory toward a monograph on Acupuncture and Moxa.

Mr. Allan Salant, Reference Librarian, has resigned to accept the position of Health Center Librarian at Ohio State University. Miss Riccarda Marino, Senior Reference Assistant, has resigned in order to continue her graduate studies. Mrs. Sylvia Getchell, Cataloguer, has resigned to accept a position at New Hampshire University Library. Mr. Eugene Herscher, Library Assistant

in the Neurology Library, has resigned to accept a position with the Northwestern University Libraries. Mr. Francis O'Leary, Library Intern, resigned to accept a position in the Columbia Zoology-Botany Library.

The Bibliographic Service established twelve years ago continued to support the work of a number of projects in the Medical Center. Members of the Library staff keep the various projects informed of new literature pertinent to the work under investigation. During the year, 26 new projects were added to the Service and 72 were terminated. A total of 144 projects were supported during the year by approximately 23,000 references. Next year, because of budgetary restrictions, the Library will be forced to place the Bibliographic Service on a partially self-sustaining basis.

Respectfully submitted,

Willard C. Rappleye, M.D.
Dean

June 30, 1951

COLUMBIA UNIVERSITY
BULLETIN OF INFORMATION

Fifty-second Series, No. 46 November 29, 1952

Report of the Dean of the Faculty of Medicine

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1952

COLUMBIA-PRESBYTERIAN MEDICAL CENTER
168TH STREET AND BROADWAY
NEW YORK 32, NEW YORK

Columbia University Bulletin of Information

Fifty-second Series, No. 46 November 29, 1952

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The series includes the Report of the President to the Trustees and the Announcements of the several Colleges and Schools relating to the work of the next year. These are made as accurate as possible, but the right is reserved to make changes in detail as circumstances require. The current number of any of these Announcements may be obtained from the Office of the Secretary, 213 Low Memorial Library.

C. U. P. 8,340—1952

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FACULTY OF MEDICINE

REPORT OF THE DEAN

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1952

The registration of the School of Medicine was as follows:

First year	119
Second year	115
Third year	116
Fourth year	105
TOTAL	455

The new national matching plan for internships went into operation for the first time during the past year. The fourth-year students were highly successful in their appointments. Practically every student who chose a teaching hospital was accepted on his first, second or third choice, a record which is highly gratifying.

Residents from 45 states, totaling 1,618 students from 250 colleges, applied for admission to the first-year class entering in September, 1952. The 120 students accepted received their liberal arts education in 48 different colleges and came from 22 states.

The Committee on Admissions deserves great credit for the thoroughness with which they select our students. We have had an unusual record for the past few years of an almost unanimous promotion record each year. The Committee continues to place great emphasis in the selection of students on factors other than grades, although candidates must give evidence that they are able to carry the academic program.

Preference is given in the selection of students to those who have shown, in the opinion of the Committee on Admissions, high achievement in their college education, a mature sense of values and sound motivation, qualities of leadership, willingness, and ability to assume responsibility, and who, therefore, have already given evidence that they are likely to succeed in medicine.

The importance of a broad liberal education cannot be overemphasized. The practice of medicine is both a science and an art, and to

treat the patient as a whole man, the doctor must be a whole man himself. Students planning a career in medicine should be motivated toward becoming leaders in medical thinking, rather than technicians, because medical practice is both a private enterprise and a public responsibility. The liberal arts college offers the opportunity to prepare for a happier and more useful life of citizenship. Years of specialization may lie ahead in a professional career, but the foundation of all advanced study is a broad liberal education.

The wide distribution of applicants for admission and the acceptances are illustrated in the following figures:

Area	*Applicants*	*Acceptances*
New York City	625	56
New York State (exclusive of New York City)	179	9
Other states or territories	761	53
Foreign	53	2
TOTAL	1,618	120

The Dental School's registration was as follows:

First year	40
Second year	39
Third year	34
Fourth year	26
TOTAL	139

During the year there were 113 students registered for noncredit postgraduate courses in the Dental School and 32 students registered for postgraduate credit courses. A class of 23 students was enrolled in Dental Hygiene and 8 received the Bachelor of Science degree.

In the School of Public Health the registration was as follows:

D.P.H. candidates	4
M.P.H. candidates	32
M.S. candidates	71
TOTAL	107

The registration in the School of Nursing was as follows:

First year	90
Second year	104
Third year	113
TOTAL	307

During the past year there were 704 students from 22 affiliated schools of nursing who received instruction under the Department of Nursing in the various hospital and laboratory units of the Medical Center.

In the Course for Occupational Therapists 50 students were registered; 52 students were registered in the Course for Physical Therapists.

The following degrees were awarded during the year:

M.D.	105
Med.Sc.D.	6
D.D.S.	26
M.P.H.	33
M.S. (Public Health fields)	54
B.S. (Nursing, Occupational Therapy, Physical Therapy, Dental Hygiene)	97

In addition to the students enrolled under the Faculty of Medicine there were 81 students registered under the Graduate Faculties of the University who took courses and advanced research work in the departments of the Medical School.

It is evident from the preceding figures that the Faculty of Medicine is responsible for the instruction of many more students, graduate and undergraduate, than is commonly understood. The total of medical, graduate, postgraduate, nursing, occupational therapy, physical therapy, dental, dental hygiene, and public health students, visiting scholars, fellows, hospital residents, and young staff members runs to over 3,000 full-time and part-time students.

It is gratifying to report that during the academic year 83 of the medical students received scholarships averaging about $411 per student.

Joseph C. Shipp was given the Janeway Prize, awarded to the graduate who, in the opinion of the Faculty, has ranked highest in efficiency and

ability. The Borden Undergraduate Research Award was given to Winifred J. Angenent for outstanding research work during her medical course. The Dr. Harold Lee Meierhof Memorial Prize in Pathology was awarded to Vincent P. Perna and Edwin P. Maynard. The Dr. William Perry Watson Prize in Pediatrics was awarded to Joseph Shipp. The Edwin G. Zabriskie Prize in Neurology was given to Robert A. Evans. Carmine M. Fasano received the Prize for Excellence in Pedodontics awarded by the Class of 1929. The Sigma Epsilon Delta Award was given to Daniel Glass. The Van Woert Scholarship Award was given to Joseph C. DeLisi. The Prize for Excellence in Operative Dentistry was awarded to Joseph C. DeLisi. The Ella Marie Ewell Medal in Dentistry was awarded to Carmine Fasano. The Frederick P. Gay Memorial Award was given to James C. Taylor. The Rowe-Wiberg Medal was awarded to Robert H. Van Buren.

It is with the greatest sorrow that we report the following deaths during the year:

Fanny von Hann-Kende, Associate in Psychiatry, on April 14, 1952
Octa C. Leigh, Assistant Attending Surgeon, Vanderbilt Clinic, on December 26, 1951
James F. Norton, Assistant Clinical Professor of Obstetrics and Gynecology (Margaret Hague Maternity Hospital) on September 27, 1950
Phyllis L. Partridge, Instructor in Nursing, on January 17, 1952
John B. Pastore, Lecturer in Hospital Administration, on August 18, 1951

The following designations were made during the year:

Robert C. Darling, Executive Officer of the Department of Physical Medicine and Rehabilitation, effective January 1, 1952
Alfred Gellhorn, Director of the Institute of Cancer Research, from January 1, 1952
Alfred Gilman, Acting Executive Officer of the Department of Pharmacology, from January 1, 1952 to June 30, 1952
Eleanor Lee, Acting Executive Officer of the Department of Nursing, for 1951–1952
Edgar G. Miller, Jr., Acting Executive Officer of the Department of Biochemistry, from July 1, 1951 to September 30, 1952
Carl T. Nelson, Executive Officer of the Department of Dermatology, from July 1, 1951

Emanuel M. Papper, Executive Officer of the Department of Anesthesiology, from January 1, 1952

Harry M. Rose, Executive Officer of the Department of Microbiology, effective July 1, 1952

The following retirements are reported:

Ewing C. McBeath, Professor of Dentistry, effective January 31, 1953

Philip E. Smith, Professor of Dentistry, effective January 31, 1952

Byron Stookey, Professor of Clinical Neurological Surgery and Attending Neurological Surgeon, Presbyterian Hospital, effective June 30, 1952

The following emeritus designations were made by the Trustees:

Ewing C. McBeath, Professor Emeritus of Dentistry, from February 1, 1953

Philip E. Smith, Professor Emeritus of Anatomy, from February 1, 1952

Byron Stookey, Professor Emeritus of Clinical Neurological Surgery, from July 1, 1952

The following change of title was made:

Alfred Gellhorn, Associate Professor of Medicine (Francis Delafield Hospital), from January 1, 1952

Among the promotions made during the year were those of:

Robert C. Darling, Professor of Physical Medicine and Rehabilitation, from January 1, 1952

Marie L. Franciscus, Assistant Professor and Director of Training for Occupational Therapists, effective September 1, 1951

Carl T. Nelson, Professor of Dermatology, from July 1, 1951

Emanuel M. Papper, Professor of Anesthesiology, from January 1, 1952

Harry M. Rose, John E. Borne Professor of Medical and Surgical Research, from July 1, 1952

George Rosen, Professor of Public Health Education, from September 1, 1951

Irwin B. Wilson, Assistant Professor of Biochemistry (assigned to Neurology), from January 1, 1952

Stephen Zamenhof, Assistant Professor of Biochemistry, from December 1, 1951

Effective July 1, 1952, the following promotions were made:

Thomas H. Allen, Associate Professor of Pharmacology

Gordon M. Bruce, Professor of Clinical Ophthalmology

Erwin Chargaff, Professor of Biochemistry
Wilfred M. Copenhaver, Professor of Anatomy
David Cowen, Associate Professor of Neuropathology
Zacharias Dische, Associate Professor of Biochemistry
Seymour P. Halbert, Associate Professor of Microbiology
Elvin A. Kabat, Professor of Microbiology
George B. Koelle, Associate Professor of Pharmacology
William S. Langford, Professor of Clinical Psychiatry
Seymour Lieberman, Associate Professor of Biochemistry
David Rittenberg, Professor of Biochemistry
William B. Snow, Professor of Physical Medicine
Carmine T. Vicale, Associate Professor of Clinical Neurology
William W. Walcott, Associate Professor of Physiology

During the year the following new appointments were made:

Margaret W. Barnard, Associate Professor of Public Health Practice, effective September 1, 1951
E. Dwight Barnett, Professor of Administrative Medicine and Director of the Institute of Administrative Medicine, effective January 1, 1952
Edward E. Gordon, Associate Professor of Rehabilitation Medicine, from July 1, 1952
Anderson C. Hilding, Professor of Otolaryngology, effective September 1, 1951
James E. McCormack, Associate Dean (Graduate Studies) and Assistant Professor of Medicine, effective September 1, 1951
Annie V. Scott, Visiting Professor of Pediatrics, effective September 1, 1951
William C. Spring, DeLamar Professor of Public Health Practice, effective July 1, 1952

THE GRADUATE AND POSTGRADUATE PROGRAM

The cutoff date for benefits under the Servicemen's Readjustment Act of 1944 was July 25, 1951. As anticipated, there was some reduction in enrollment in postgraduate courses during the year just finished. During the year there were 552 registrants in 65 postgraduate courses. This program is subject to continuous review to maintain its usefulness and vigor. A number of courses have been dropped and new ones established. At the request of the New York State Department of Health a two-week course in cancer was offered during the Spring and will be offered twice next year. A three-month course in cerebral palsy was offered in

cooperation with the Coordinating Council for Cerebral Palsy in New York City, Inc. This course will be repeated twice next year if there is sufficient demand.

It is possible that many medical reserve officers who were called to military duty in Korea will be returned to civilian life during the next year. Our program is believed to offer a significant opportunity for them to review various aspects of clinical medicine and facilitate their return to civilian practice.

Seventy-one visiting scholars from thirty-one foreign countries came to the School during the year for periods up to a full year of study. In addition, hundreds of foreign physicians visited for brief periods. Numerous requests are received from physicians in various parts of the world who wish to visit the School and the Medical Center under the various international educational exchange programs sponsored by the American government and by private foundations. Only a limited number of these requests can be accommodated.

STUDENT HEALTH SERVICE

The Student Health Service under the able direction of Dr. Albert R. Lamb, Jr. is continuing its excellent coverage of the health needs of the students and employees under the Faculty of Medicine. Students hospitalized in the Admitting Ward are under the care of the Student Health Service until transferred to the appropriate hospital service.

During the past year there were 205 students admitted to the Admitting Ward and 39 to the Hospital. The Service has daily consultation hours and provides the routine physical examinations of all first- and third-year students in medicine, dentistry, dental hygiene, occupational therapy, physical therapy, and public health. A special feature is the active tuberculosis control program which has been a very valuable asset in the students' health. The routine dental examinations, including dental X rays, have been made available to the student body.

Aside from the routine health services provided, the Student Health Service acts as a very useful agency for the handling of other student problems. It renders many additional services, such as pre-marital medical examinations, the maintenance of adequate records, services of all kinds for intern and insurance applications and the immunization of in-

dividuals planning to go into the Armed Services or to foreign countries. All of these intimate contacts with the students have given Dr. Lamb and his associates invaluable insight into the problems of the students and have been of constructive help to the Faculty and the Dean's Office.

The Personnel Medical Clinic under the Student Health Service continues to provide routine health services for the clerical and technical employees and conducts the examinations of all persons placed on the payroll.

INSTITUTE OF CANCER RESEARCH

During the past year additional laboratories for cancer research have been placed in operation and have proven of enormous value to the whole Medical Center. By the rearrangement of space assignments, it has been possible to augment greatly the facilities for research in a number of major departments. This increased greatly the opportunities for further contributions toward the advancement of knowledge regarding abnormal growth and malignancy. The entire program is integrated under the Institute of Cancer Research, of which Professor Alfred Gellhorn is the Director. Great progress has been made during the past year under his able leadership.

The fundamental plan of cancer research at our institution is the development of an attack characterized by breadth and depth. In order to achieve this we are integrating, with ever increasing effectiveness, medical education, research, and patient care in the broad field of neoplastic disease.

Laboratory research is conducted in a number of the departmental laboratories of the Medical School and in 125 laboratories contained in the four floors of the College which are specifically allocated to cancer research. Clinical research on neoplastic disease is accomplished on the wards of the associated hospitals comprising the Columbia-Presbyterian Medical Center and more particularly in the recently opened 300-bed cancer hospital, the Francis Delafield Hospital. These constitute the physical facilities of the Institute of Cancer Research.

More important than the space and equipment, however, are the investigators who teach, provide medical care for cancer patients, and, through research, strive to broaden the knowledge of abnormal growth.

The men and women who are the Institute of Cancer Research have skills and training in every basic medical discipline and every clinical speciality. This is recognized by academic appointments in the various departments of the Faculty of Medicine. Thus the Institute of Cancer Research implements the concept that investigation of the biological and clinical problems presented by abnormal growth can best be pursued by voluntary interdepartmental cooperation. With this organizational pattern the techniques, skills, and specialized knowledge of multiple scientific disciplines can group and re-group as the issues under study dictate. The administrative mechanism to facilitate the work of this federation of scientists and clinicians is provided by the Coordinating Committee of the Institute of Cancer Research.

The following table indicates the considerable growth of the Institute of Cancer Research for 1950–51:

	1950–51	*1951–52*
Personnel	157	206
Laboratory space	65,250 sq. ft.	92,500 sq. ft.
Patients	4,034	5,287

As can be seen, the total personnel engaged in cancer research at the Institute has increased from 157 to 206. In the scientific report of the Institute the index of investigators lists 98 professional investigators. Thus, in the year 1951–1952, the ratio of technicians to investigators was about 1:1. The fact that during the current year there have been 98 scientists engaged in cancer research indicates the increasing participation of the staff of the College of Physicians and Surgeons in the problems of abnormal growth.

The laboratory space devoted to cancer research has increased by about 40 per cent during the time period indicated, and the number of cancer patients cared for at the Columbia-Presbyterian Medical Center including the Francis Delafield Hospital has risen about 30 per cent.

RECENT DEVELOPMENTS

The renovations in the Presbyterian Hospital have been largely completed, making the operating room and other facilities completely modern. There has been a considerable expansion in the private office and private room facilities to the advantage of the staff in private

practice and on a geographic full-time basis. The integration of the program of the Francis Delafield Hospital has been going forward actively and with great promise.

During the year the Department of Anesthesiology was created and gave great impetus to that branch of clinical medicine and scientific research. The new Department of Physical Medicine and Rehabilitation was launched through the generous support of friends of the University. The creation of this Department and the further strengthening of the affiliation with the Institute for the Crippled and Disabled are opening widening opportunities for public service and the development of adequate care and study of the problems of handicapped individuals, of whom there are some twenty-three million in this country.

The new Department of Microbiology emphasizes the trend in this area of medical science. The Institute of Administrative Medicine is going forward with its important program. During the year, on the recommendation of the Faculty, the Trustees created an Institute of Research in Animal Diseases, and thereby gave recognition and impetus to an area of study which has been developing at the Medical Center for many years. The affiliations with other institutions in the community have been further strengthened during the past year.

TRENDS IN MEDICAL CARE

The Faculty is very much aware of the impact of the social, economic, and political developments throughout the country. The continuing expansion of voluntary medical insurance plans need only be cited to illustrate the extent to which these developments may influence medical practice, hospital services, and, indirectly or even directly, medical faculties and medical education. There are about eighty-six million individuals who have varying degrees of protection against hospital expenses. The number has increased about seventy million in the last ten years. The establishment of such a large proportion of the population of the nation on some form of prepayment hospital insurance, whether complete or only partial, suggests the magnitude of the influence of that development upon hospital and medical practice. Surgical expense coverage is now in the neighborhood of sixty-five million persons, com-

pared with only seven million in 1941. Medical expenses protection during the year covers close to twenty-eight million individuals, compared with only three million ten years ago. There has been a very considerable increase also in the protection against loss of income during illness or disability, so-called medical indemnity insurance or cash benefits.

The Faculty is also cognizant of the changes in medical services which have a direct bearing on the forms and methods of practice. Such factors as the aging of the population, the rapidly increasing proportion of chronic diseases and disabilities, the speed with which scientific advances are being made, the influence of inflation and hence of rising costs of medical care, the development of home medical services, the need for adequate diagnostic and hospital facilities and personnel in many communities, the expanding activities in public health, are factors which place upon the Faculty a continuing and ever-growing responsibility for keeping the instructional program and the clinical services effectively gauged to the shifting demands of medical care. All of these factors have had a direct influence on the content of our teaching and the methods of ward and outpatient instruction.

Also affecting our teaching program are the advances now being made in such fields as psychiatry, preventive medicine, rehabilitation medicine, medical economics, and similar areas. Some voices advocate very extensive revision of the basic approach to medical education to emphasize the social and economic aspects of medical care. These are important features of medical service and hence of medical education but they must supplement, not substitute for, the necessary fundamental training in the basic sciences upon which the future of medical progress, medical care, and public service must depend. It is important that medical education be not diluted nor diverted from the meticulous, accurate training of physicians which has been the foundation of progress in medical education in this country during the last forty years. The interpretation and application of the social and economic factors in matters of health and disease must be given full consideration in community health matters, but it would be short-sighted and, in the long run, undesirable to weaken sound education of medical, dental, and public health students in the underlying biological sciences.

THE RESIDENCY SYSTEM

During recent years there has been a considerable shift in the staff organization of many hospitals throughout the country, with increasing emphasis upon the development of the hospital resident system. Under this plan hospital residents do a substantial part of the surgery, under supervision of the senior staff, on the patients in the wards of the hospitals. Many of these young men spend a period of years and become highly proficient in diagnosis and therapy. Toward the latter part of their training they become thoroughly competent to deal with many surgical and other procedures. It has been felt for some time that it would be wise to have provision made for temporary and limited licensure to practice medicine of individuals who serve on the upper residency staff of hospitals which have the residency system; such individuals to be given temporary licensure only while they remain on the house staff of the given hospital, and provided also that they are graduates of approved medical schools. This device would be in the public interest and also strengthen the programs of the hospital and of graduate medical education. Our Faculty is in favor of securing and is now working with the State Education Department, the State Medical Society, and the State Hospital Association to secure the necessary permissive legislation in the next session of the State Legislature.

FINANCING MEDICAL EDUCATION

In last year's report considerable attention was given to the problems of financing medical education, with the suggestion of some form of multi-lateral financial support. The Trustees of the University have gone forward during the year with the development program for the Medical School and have created a Council on Medical Affairs. Later they will launch through the Development Committee for the Medical School a fund-raising program, synchronizing it with the Bi-Centennial Fund of the University. Everyone is hopeful that this program will enlist wide interest and substantial support for the urgent needs of the Medical School in order that it may continue to carry its full responsibility in the training of physicians, dentists, nurses, public health and other health personnel so necessary to the national needs. The aim will be to con-

centrate largely upon support for operating funds and the development of an adequate library, which is the greatest need of the Medical Center at the present time and which is so essential to a modern educational program. There are also opportunities for strengthening the staff through the regular departments and the retention of competent young men whom we are in a position to train in the most modern scientific and medical procedures.

Reference to the importance of financial aid for medical students draws attention immediately to the problems of the individual financing his own professional education. "Insurance against the erosion of high educational standards for medical personnel" must of necessity concern itself with the economic problems confronting the individual who desires to study medicine. Not only are the medical schools and universities confronted with the problem of adequate financial support, but each individual who faces the long period of college preparation, of medical school training, and the years of hospital experience, has this major problem. Even during the hospital period of training the individuals are called upon to perform skilled services of a high order on a scale of pay which bears no relationship to the years of preparation and substantial investments of money by the institutions and the families of the student concerned. Circumstances are making it increasingly difficult for students of superior ability who lack financial resources to undertake medical studies, particularly in private institutions where the rates of tuition are much higher than those in the state university medical schools.

These problems are obviously associated with the long period of professional training that is necessary for the adequate preparation of the modern physician. They grow out of the intensified and concentrated instructional program, which did not exist in the earlier days of apprenticeship training in medicine, and which endeavors to develop rapidly a high degree of competence in every graduate by the completion of his school or hospital service. Medical education is motivated by a realization that the medical schools and teaching hospitals have the responsibility of graduating individuals able immediately thereafter to deal with matters of life or death.

Pressures to shorten medical education and to lower its standards are

well-known but it would be against the public interest to permit a reduction in those standards which would impair the competence and ability of the physician. The answer is to provide more satisfactory financial support through scholarship and fellowship assistance so that individuals with the ability, educational background, and desire to do so may continue their education for the period of time necessary to insure their competence for satisfactory family practice or specialization.

Of the greatest importance is scholarship aid for students of outstanding ability. The University continues its approach to friends, foundations, industry, national and local public health organizations, the American Medical Education Foundation, the National Fund for Medical Education, the various government departments, alumni, and every other possible source of help in carrying forward the program of the Medical School.

Much is being said these days about various forms of sickness insurance. This term is a misnomer because most discussions of this topic deal only with the economic or financial aspects of medical services. That in effect is not sickness insurance at all. Real sickness insurance is guaranteeing as far as humanly possible that physicians, dentists, nurses, public health and other professional personnel are adequately trained and competent to perform modern up-to-date health services for the individual patient and the community. Hence, the real insurance investment should be in personnel as the only sound and reasonable protection for the future medical care of the American people. Nothing would be more illusory or unsound than to believe that the financing of medical services per se will in any degree guarantee proper, sound and progressive medical services in the future. The key to this entire situation for the future and, hence the real point that is involved, must be adequate support of medical education and research.

Many of the problems mentioned above were visualized and in a surprising degree anticipated by the pioneers who planned the Columbia-Presbyterian Medical Center. The aim then, as now, was to bring about an integration of the highest quality of medical and hospital services with the essential elements of teaching and research.

There is agreement between the Hospital and the University on the unity of purpose of the two institutions. Through the contributions and efforts of the professional staffs an environment has been created which

distinguishes a teaching institution from that of an ordinary hospital, however excellent the latter may be. Such a climate is often taken for granted but it was no mere accident that brought about the building of this institution of learning. The credit goes to the wisdom and foresight of the founders of the Columbia-Presbyterian Medical Center. The basic principles which they enunciated a quarter of a century ago are just as sound today as they were then.

DEPARTMENT OF ANATOMY

Professor Samuel R. Detwiler, Executive Officer

The Department of Anatomy registers, with profound regret, the retirement of Professor Philip E. Smith as of January 1, 1952. Professor Smith came to Columbia University as Professor of Anatomy in 1927 and during his twenty-five years of tenure he served the Department faithfully and meritoriously. He has received the much deserved title of Professor Emeritus of Anatomy.

Associate Professor Wilfred M. Copenhaver has been promoted to Professor of Anatomy. Dr. Dorothy D. Johnson has been promoted from Instructor to Assistant Professor. Mr. Christian Hovde has been appointed Instructor in Anatomy. Associate Professor George K. Smelser was on leave for the year to serve on the staff of the London Office of Naval Research.

There have been no drastic changes in the instruction of first-year medical and dental students, although Professor Edmund Applebaum and his staff are making constant effort to improve the courses in oral histology and embryology given to freshman and graduate dental students and hygienists.

Fifteen basic science courses for residents from affiliated hospitals have been offered, with a total registration of 146.

Professor Adolph Elwyn has continued to carry a heavy load of teaching, and is working intensively on the third revision of the text on *Human Neuroanatomy*.

Professors Smith and Copenhaver are working on the thirteenth revision of Bailey's *Textbook of Histology*.

Professor Emanuel Kaplan's book *Functional and Surgical Anatomy of the Hand* is nearing its completion and will be published by J. B. Lippincott Company. The excellent illustrations for this book were done by the departmental artist, Mr. Kellner. Professor Kaplan is continuing with his investigations on the comparative anatomy and embryology of the hand.

The research activities of Professor Dan H. Moore have been concerned principally with the problem of shock and the problem of purifying and testing the active agent of mammary carcinoma in mice. In collaboration with

graduate student Douglas Worf and Dr. Victor Ross of the Department of Biochemistry, the importance of autolytic enzymes in the shock syndrome is being investigated. After an injury (burn, trauma, or ischemia), it has been found that there is an exchange of blood and tissue substances which appears to result from an autolysis of capillary walls and cell membranes. This can be prevented by applying cold immediately after injury. Attempts are in progress to isolate and characterize the exchanged substances.

In the cancer work, physical procedures have been used in obtaining monodispersed preparations of virus-like particles from mouse mammary cancerous tissue. Results of assays begun at the University of Leeds in 1950 in collaboration with Professors R. D. Passey and L. Dmochowski are now almost complete, and reveal high activity in doses containing only 10^{-10} mg of nitrogen (milk agent). Treating preparations with trypsin seems to increase the activity.

During the past year, Professor Moore has been active in forming the New York Society of Electron Microscopists, which has a bibliographic service located in the New York Academy of Sciences building.

Professor Herbert Elftman has investigated the cytochemistry of the Golgi apparatus. The development of new methods has greatly facilitated the study of this important cell constituent and its relation to cellular function. Professor Elftman has also continued to serve as a member of the Lower Extremity Committee of the research program on artificial limbs, sponsored by the National Research Council.

Professor Copenhaver is continuing his studies on the specialized conduction system of the mammalian heart with particular reference to cytochemical differences between conduction tissue and typical cardiac muscle.

In collaboration with Professor Samuel R. Detwiler, it has been found that amphibian larvae reared for long periods in propylthiouracil develop chondromas. The transplantability of these tumors under varied conditions is being investigated.

Professor Charles R. Noback is engaged with histo-chemical studies on myelination of normal and regenerating nerve, and with metachromasia in normal and regenerating nerve. This work is being supported by a grant from the Coordinating Council for Cerebral Palsy in New York City, Inc.

Professor Applebaum, with the collaboration of Dr. Alexander Seelig, is continuing the studies of changes in the oral tissues of rats following experimentally induced hypertension. This study is made possible through the kindness of Professor Abbie Knowlton of the Department of Medicine, who made the material available. Professor Applebaum and Dr. Henry P. Levy have conducted experiments on white mice to determine whether changes can be induced in the temporomandibular joints by the use of very small orthodontic appliances.

Professor Seelig is continuing his studies on the effects of different filling materials on the teeth of monkeys.

Professor Johnson has continued her studies of normal and pathologic human islet tissue, using various special staining techniques. In collaboration with Professor Frederic J. Agate, Jr., studies are being made of the nephrosis which results from the implantation of mouse sarcoma 180 into normal and gonadectomized hamsters.

Professor Agate is investigating chemical and cytological changes which occur in the adrenal of the hamster concurrently with nephrosis and edemas following implantation of mouse sarcoma 180 into the gonadectomized animal. With Professor Samuel Graff of the Department of Biochemistry studies are being conducted on herterologous transplantation of mouse tumors into adrenalectomized hamsters. With the cooperation of Professor Perry B. Hudson of the Department of Urology and Professor Edith E. Sproul of the Department of Pathology, Francis Delafield Hospital, studies are being conducted on the ascorbic acid and cholesterol content of the human adrenal from surgical and post-mortem material.

Professor Charles A. Ely has investigated the effect of estrogen and combinations of estrogen, pituitary extract and antigonadotrophic serum on the testis of A strain mice. It has been observed that profound changes are induced in the testes of mice treated with estrogen and pituitary extract and evidence is being accumulated which indicates that such treatment influences subsequent interstitial cell tumor formation.

Professor William M. Rogers has completed a study of the functional anatomic relationship between musculature and bony form with respect to asymmetry of the splanchnocranium. He is contributing the embryological section to a book on *The Thyroid,* edited by Professor Sidney C. Werner of the Department of Medicine. With Dr. Solomon L. Katz of the Department of Dental and Oral Surgery, studies of clinical cases of temporo-mandibular joint disfunction are nearing completion. Professor Rogers has contributed a section of the gross anatomy to the late Professor Moses Diamond's book entitled *Dental Anatomy.* This book is scheduled for early publication by the Macmillan Company of New York. Professor Rogers continues with his study of the relationship of body weight, age, and sex to nerve degeneration time in the rat.

Professor Harry H. Shapiro has given a series of lectures in applied anatomy to the Army Medical School in Washington and at Tufts College Dental School. During the summer of 1951 he lectured on applied anatomy of the head and neck at the Universities of London and Bristol, England, and before the American Dental Society of Europe at Lausanne, Switzerland. With Dr. Sidney L. Horowitz of the Department of Dental and Oral Surgery, studies are being conducted on the effects of removal of por-

tions of the facial musculature upon the skeletal framework in the young rat.

Professor Detwiler has completed a series of investigations dealing with the role of the medulla upon the differentiation of the labyrinth, and is at present engaged with experiments dealing with the embryonic induction of neural retina from the pigment epithelial layer of the eye. Working under his direction, Dr. Howard Holtzer, post-doctorate Public Health Fellow, is pursuing a series of studies upon the abnormal development and morphogenesis of the vertebral column in relation to experimentally produced abnormalities of the spinal cord.

DEPARTMENT OF ANESTHESIOLOGY

Professor Emanuel M. Papper, Executive Officer

On January 1, 1952 the Department of Anesthesiology was established in the Faculty of Medicine. As part of the program of development and strengthening this Department, appointments of Dr. Herman Schwartz and Dr. Herbert Rackow as Instructors in Anesthesiology were made during this academic year. Dr. Jean Henley was appointed Instructor and assigned to the Francis Delafield Hospital. The Department was also strengthened by the appointment of Dr. Joseph Kreiselman as Assistant Professor assigned to the study of problems of asphyxia in the newborn.

Professor Philip A. Lief has resigned from his position as Director of Anesthesiology at the Montefiore Hospital but continues to take part in departmental activities at the Mount Sinai Hospital. The Department notes with regret and pride the resignation of Professor Thomas F. McDermott to assume the position of Professor of Anesthesiology and Director of the Department at the Georgetown University School of Medicine. Dr. Vance Lauderdale, Jr., received a military leave of absence to join the United States Army.

The teaching program for the medical students has not been precisely defined because of the recency of the establishment of departmental status. The entire teaching program for undergraduate students is performed in courses given by other departments. The program consists at the present of a demonstration in the second-year course in pharmacology, a demonstration in the thoracic surgery exercises in the second-year course in surgery, approximately eighteen hours of practical supervised teaching in the operating rooms of the Medical Center during the third year, and elective periods in both the third and the fourth years. These last three exercises are carried out for students assigned to the Department of Surgery.

In contrast to undergraduate teaching, the graduate training program for specialists in anesthesiology is a firm and strong one. The residency and

graduate student training program is the second largest in the country and is well-balanced clinically and scientifically.

The laboratory facilities available to the Department have been greatly expanded, and are now, for the first time, adequate for the various investigative programs which were undertaken.

Professor Duncan A. Holaday has completed his development of an explosion-proof pH meter designed to make rapid and repeated determination of pH in the arterial blood during the administration of anesthesia. Together with Dr. Dorothy Ma, Professor Holaday has carried on studies of acid base balance before, during and, after anesthesia and operation. Professor Holaday has made a new observation which appears to be of considerable importance. A metabolic acidosis may occur in association with, or because of, the development of respiratory acidosis. These studies were supported by a grant from the National Tuberculosis Association and the generosity of Mr. Charles B. Wrightsman.

Together with Dr. Herbert Volk of the Department of Surgery, and Dr. Julian Mandell of the Department of Radiology, Professor Holaday has continued his studies of the electrical activity of the small intestine. Professor Holaday has been concerned also with the development of simpler methods of measuring the blood gases in the presence of anesthetic agents.

In collaboration with Professor George B. Koelle and Dr. Kazuya Camijo of the Department of Pharmacology a study of the effects of DFP on conduction and transmission in the autonomic nervous system was begun by Professor Holaday.

With Professor Shin-Chun Wang of the Department of Physiology, Drs. Shin-Hsun Ngai and M. Jack Frumin have continued their studies of the organization of the respiratory center in decerebrate cats. Drs. Frumin and Nagi, in collaboration with Professor Wang of the Department of Physiology, continued their studies of the neural control of vascular resistance in the dog's hind limb. Preliminary studies on the mechanism of respiratory stimulation following carbon dioxide inhalation and on the mechanism of the carotid sinus reflex in the control of arterial pressure were begun this year, also in collaboration with Professor Wang.

Dr. Nagi, together with Professor Ralph A. Deterling, Jr. of the Department of Surgery and Dr. John H. Laragh of the Department of Medicine, concluded their studies of the effects of dilute drip injections of epinephrine and norepinephrine upon cardiac rhythmicity and arterial pressure in dogs anesthetized with cyclopropane or ether.

Drs. Nagi and Frumin continued their studies on the influence of ephedrine on the vascular bed of the hind limb of the dog. Dr. Frumin and Dr. Herman Schwartz, in collaboration with Dr. John Burns of the Research Service of the Goldwater Memorial Hospital, undertook investigations in

man to elucidate the mechanism of sensory blockade during spinal and peridural anesthesia. These investigations were supported in part by The Squibb Institute for Medical Research. Drs. Frumin and Schwartz have reviewed the clinical experience with segmental peridural anesthesia in connection with their quantitative studies.

Drs. Frumin and Schwartz, in collaboration with Professor Holaday and Dr. Samuel R. Powers of the Department of Surgery, have continued their studies of the mechanism of hypotension following cyclopropane anesthesia. These studies are currently directed along lines of correlating the hemodynamic changes during cyclopropane anesthesia with the distribution of electrolytes in body fluids.

Professor Virginia Apgar has continued her studies on the transplacental passage of merperidine from mother to newborn, in collaboration with Dr. Bernard B. Brodie of the National Health Institute and Dr. Burns of the Goldwater Memorial Hospital. Professor Apgar has designed an objective code for the evaluation of the newborn infant. Approximately 600 babies have been coded to date in an attempt to have objective evaluation of the condition of the newborn at birth. Professor Apgar has continued her investigations in the problem of resuscitation of the newborn. Together with Professor Joseph Kreiselman she has studied the efficacy of the Bloxsom Air-Lok. Professor Apgar has also studied the problem of artificial ventilation with Professor Richard L. Day of the Department of Pediatrics.

Professor Emanuel M. Papper has continued his studies on the physiological disposition and the intermediary metabolism of various barbiturate drugs with the aid of a grant from The Squibb Institute for Medical Research. This study is a collaborative one with Professor Philip A. Lief, Dr. Bernard B. Brodie of the National Heart Institute and Dr. Burns.

Professors Papper and Lief, together with Dr. Alfred A. Wollack of the resident staff in Anesthesiology, have continued their investigations of the metabolism of narcotic analgesics in association with Drs. Brodie and Burns.

Professor Papper has continued in the collaborative project of the studies of renal functions during anesthesia and operation with Professor Stanley E. Bradley of the Department of Medicine and Professor David V. Habif of the Department of Surgery. Professor Papper has continued his collaboration with Professors Arthur Blakemore and Deterling and Drs. Hugh Fitzpatrick, Enzo Krahl, and Samuel R. Powers of the Department of Surgery on the study of cardiovascular function during anesthesia and operation. The project was generously supported by the National Heart Institute of the National Institute of Health. The data is being collected at the present time and prepared for publication.

Dr. Schwartz, together with Dr. William Derrick of the Peter Bent Brigham Hospital in Boston, have studied the influence of anesthesia and operation upon patients with Addison's Disease. Dr. William S. Howland

completed his study of the utility of hyaluronidase in effecting topical anesthesia with pontocaine.

Dr. Beatrice Selvin has demonstrated, in patients subjected to spinal fusion, that 1 per cent myanasin solution had a definite effect upon the reduction of postoperative pain, presumably because of the relaxation of muscle spasm. Professor Daniel P. Tausig has continued his studies with ethyl vinyl ether. Professor Tausig has begun a study of hypotensive methods deliberately induced with hexamethonium ions in patients subjected to neurosurgical procedures, in collaboration with Dr. Thomas J. Bridges, Jr., of the Department of Neurological Surgery.

Dr. Frumin and Dr. Herbert Rackow have developed a method of nasopharyngeal insufflation of nitrous oxide and oxygen, which has shown to have clinical advantages in certain operative procedures in the head and neck. Dr. Edgar C. Hanks has continued his clinical studies of the problem of cardiac arrest and has shown that most instances of this unhappy catastrophe during anesthesia are associated with excess of depth of anesthesia, anoxia, acidosis, and certain types of surgical manipulation. Dr. Frederick C. Hehre has continued his interest in the problem of shock and hemorrhage during anesthesia and operation. He has modified the accepted method of blood volume measurement to provide for as many as five determinations during the period of anesthesia and operation.

During the past year members of the Department have participated in professional activities at medical meetings and other medical schools throughout the country. Forty-nine presentations were made by members of the faculty during the academic year. These included lectures delivered at the International Anesthesia Research Society in London, the annual meeting of the American Society of Anesthesiologists, the Post Graduate Assembly in Anesthesiology in New York, and the annual meeting of the American Medical Association. Professor Apgar continued to serve as a member of the Sub-Committee on Anesthesia of the National Research Council and President of the Board of Governors of the American College of Anesthesiologists. Professor Papper was elected General Chairman of the Post Graduate Assembly in Anesthesiology and to the Presidency of the New York State Society of Anesthesiologists. Dr. Howland was elected to the Presidency of the Second District of the New York State Society of Anesthesiologists.

DEPARTMENT OF BACTERIOLOGY

Professor Harry M. Rose, Acting Executive Officer

On May 5, 1952, the Trustees of the University amended Chapter IV of the Statutes to change the name of the Department to the Department of Microbiology at the beginning of the next academic year. Concurrently, Pro-

fessor Harry M. Rose was appointed John E. Borne Professor of Medical and Surgical Research and has been designated Executive Officer of the Department of Microbiology.

Professor Elvin A. Kabat has been promoted from Associate Professor to Professor of Microbiology and has been granted sabbatical leave for the academic year 1952–1953. Professor Seymour P. Halbert has been promoted from Assistant Professor to Associate Professor of Microbiology. Professor Charles L. Fox, Jr. resigned July 31, 1951, to become Research Professor at New York Medical College. Dr. James T. Culbertson who resigned June 30, 1947, was reappointed Assistant Professor. Dr. Solon A. Ellison was appointed Instructor and took charge of the departmental teaching program for undergraduate students of the School of Dental and Oral Surgery. Dr. Ellison and Dr. Robert H. Muller have been promoted from Instructor to Associate. Dr. Alice W. Knox was promoted from Assistant to Instructor. Dr. Calderon Howe worked in the Department during the year under a fellowship from the National Foundation for Infantile Paralysis. He recently was granted a Markle Scholarship and has been appointed Associate.

Professor Claus W. Jungeblut conducted further studies of poliomyelitis while on sabbatical leave at the University of Leiden, The Netherlands. Professor Beatrice C. Seegal spent the year on sabbatical leave at Goldwater Memorial Hospital where she continued work on cytotoxic nephritis produced in dogs by anti-placental serum, investigating the possible modifying effects of pregnancy, adrenal steroids and allergic reactions.

The laboratories of the diagnostic service performed 61,836 examinations of which 31,311 were serologic tests for syphillis. This represents the largest number of examinations in the history of the service and does not include several studies designed to improve the quality of diagnostic methods and to enlarge their scope, particularly with respect to tuberculosis, viral, and rickettsial infections, and the testing of bacteria for in vitro sensitivity to chemotherapeutic agents.

Professor Rose continued his studies of substances in secretions of the human respiratory tract which modify infection by influenza and other viruses. An electrophoretically homogenous fraction has been isolated from sputum which reduces the infectivity of influenza, mumps and herpes viruses for chick embryos; the inhibitory substance is protein in nature but is not specific antibody.

Professor John D. MacLennan investigated further the proteolytic enzymes produced by *Clostridium histolyticum,* three of which have been identified and isolated in a relatively pure and highly active state. At least one of these enzymes may prove to be of value in the debridement of necrotic tissue, and clinical trials in selected cases of burns have been carried out in association with Professor Edward L. Howes of the Department of Surgery.

The results have been sufficiently promising to justify the erection of a pilot plant for large scale production. Professor MacLennan also investigated the biologic characteristics and antigenic structure of *Cl. histolyticum,* the in vivo activity of collagenase, and certain problems dealing with gas gangrene.

Dr. Margaret Holden, in collaboration with Professor Seegal, extended her studies of the effects of cortisone on cultures of cells from normal and sensitized animals, with and without the addition of specific allergens. In association with Professor Rose, Dr. Holden investigated the influence of cortisone and ACTH on infection with vaccinia virus in rabbits and on tissue damage induced by diphtheria toxin in guinea pigs.

Dr. Ellison has developed a reliable quantitative complement fixation test for the estimation of antibodies to *herpes simplex* and continued his studies of the relation of serum antibody levels to recurrent herpetic infections. Dr. Ellison is collaborating with Dr. Charles A. Carton, resident in neurological surgery, in an attempt to reproduce experimentally the reactivation of latent herpes virus by sensory root section of the trigeminal nerve.

Dr. Robert H. Muller carried out further studies of the purification and concentration of influenza virus by means of ion exchange resins. The method has been successfully employed with both A and B types of influenza virus and may be applicable to other viral species.

Dr. Samuel Raymond has devised an improved electroconvection apparatus for the fractionation of mixtures of proteins. In collaboration with Professor Rose, he employed this apparatus for the separation of anti-viral fraction from human sputum.

Dr. Knox collaborated with Professor Jungeblut in studies of poliomyelitis virus with particular reference to classification, modification of infection by cortisone, and the phenomenon of viral interference. Dr. Knox also investigated the problem of the transplacental passage of Columbia SK virus in mice.

Dr. Calderon Howe continued work on the enzymatic degradation and chemical fractionation of A and O blood group substances. His observations may provide a clue to the chemical differences between A and O substances.

Ten graduate students were candidates for the degree of Doctor of Philosophy but none of them completed their requirements during the year.

DEPARTMENT OF BIOCHEMISTY

Professor Hans T. Clarke, Executive Officer

Instruction in biochemistry has been given to the first-year medical and dental classes and to fifty graduate students under the Faculty of Pure Science. Of the graduate students, thirty-three were working toward the Ph.D. degree

in biochemistry, three at the introductory level and thirty in advanced work. Of the seventeen graduate students with major interest in other departments, only seven received laboratory instruction. Limitation of space severely restricts the number of graduate student admissions. During the year, three students completed the requirements for the Ph.D. degree and one for the M.A. degree.

Professor Erwin Brand and his group under the sponsorship of the Office of Naval Research have continued their studies on the synthesis of polypeptides. The optical properties and rotatory dispersion of synthetic isomeric polypeptides are being studied with the aid of a photoelectric spectropolarimeter which the group has successfully designed. Dr. Giuseppe Bernini from the Research Laboratories of Carlo Erba in Milan, Italy, was a visiting scholar with this group.

Professor Erwin Chargaff and his associates have continued their investigations on fundamental aspects of cell chemistry, with special emphasis on nucleoproteins and lipoproteins. Studies on the chemistry and physiological relation of inositol were continued. Professor Stephen Zamenhof, in collaboration with Professor Hattie E. Alexander of the Department of Pediatrics, studied the chemistry of transforming agents. With Professor Margaret R. Murray of the Department of Surgery, collaborative work on the chemistry of nucleic division and the mechanism of its inhibition was continued. Several visiting scholars participated in the various studies on cell chemistry. There were Dr. Christoph Tamm from the University of Basel, Dr. Edward A. Johnson of London Hospital, Dr. John N. Hawthorne from the University of Birmingham, and Dr. Charles F. Crampton, a National Research Council Fellow.

Professor Hans T. Clarke has been absent on leave from the University for the year serving with the United States Department of State as Senior Scientific Attaché at the United States Embassy in London.

Professor Zacharias Dische continued investigations on the mechanism of enzymatic synthesis of hexose-6-phosphate from ribose-5-phosphate, on the composition of the neutral mucopolysaccharides of the human serum and of the nucleotides of the heart muscle under physiological and pathological conditions.

Professor Goodwin L. Foster has continued his interest in amino acids and their derivatives. Professor Maxwell Karshan has continued his studies of the etiology of periodontal disease, with particular attention to the histochemistry and microchemistry of the gingiva and alveolar bone.

Professor Edgar G. Miller, Jr. has served as Acting Executive Officer of the Department in the absence of Professor Clarke and also as a responsible co-investigator on Professor Brand's project supported by contract with the Office of Naval Research.

Professor David Rittenberg and his colleagues have continued their studies on the rate of urea formation and excretion and of protein synthesis in man. A method has been developed for the determination of total body water. The physico-chemical reactions of enzymes and their substrates have been investigated in a variety of cases. The use of C^{14}-labeled histidine and aspartic acid for synthesis of nucleic acid in the rat has been studied. With Dr. Ronald Bentley investigations on the formation of polysaccharides and of kojic acid in molds have been carried on. In collaborative research, isotope-tracer problems in human physiology and pathology have been studied by Professor Irving M. London of the Department of Medicine. These included the bile pigment metabolism in *polycythemia vera* and on the normal, the life span of erythrocytes, and cholesterol formation in a hypercholesterolemic patient. Porphyrin synthesis in cell-free systems, and the in vitro synthesis of antibodies in spleen and liver slices were also investigated.

Dr. Victor Ross has studied the reactions of the precipitation of protamine with other proteins.

Professor David Shemin has continued his studies on the dependence of the biosynthesis of porphyrin on the tricarboxylic acid cycle. Sources of all of the carbon atoms of heme have been demonstrated and a new succinyl intermediate of the ketoglutarate-succinate reaction which is the precursor of twenty-six of the protoporphyrin carbons has been studied. Radioactive compounds thought to be intermediate in protoporphyrin formation were synthesized.

Professor David Sprinson and his associates have investigated the biosynthesis of shikimic acid in mutants of *E. coli* in order to study the formation of aromatic amino acids, and have continued the investigation of the utilization of methyl groups from glycine and serine in the synthesis of choline and purines. The role of glyceric acid and ethanolamine as precursors for glycine and serine is being investigated.

Speakers in the departmental seminars included: Dr. G. R. Barker of the University of Manchester, Dr. Sidney P. Colowick of Johns Hopkins University, Dr. J. N. Hawthorne of the University of Birmingham, Dr. E. R. Holiday from the London Hospital, Dr. K. Martius of the University of Tuebingen, Dr. Severo Ochoa, Dr. E. Racker and Dr. Sarah Ratner of New York University, and Dr. Maurice Stacey of the University of Birmingham.

DEPARTMENT OF DENTAL AND ORAL SURGERY

Professor Maurice J. Hickey, Executive Officer

The Department has completed the academic year with no essential changes in the teaching program. Several part-time teachers have been

granted leaves of absence for the duration of their military service. The increased teaching load has largely been absorbed by the full-time staff. Any further depletion of the Faculty without satisfactory replacement will pose serious problems.

The demand for admission to the School of Dental and Oral Surgery showed a moderate decline. A total of 586 completed applications were processed and 40 students were admitted to the first-year class. This represents a drop of 80 applicants when compared with the previous year. Applications were received from 26 states, District of Columbia, Hawaii, Puerto Rico and 13 foreign countries. The accepted students represent 5 states.

Courses for dental hygienists accepted seventeen new students which included two given advance standing as the result of work completed in other schools.

The staff in all divisions continued to contribute extensively to professional society activities and to the professional literature.

DENTAL CLINIC

During the twelve months' period from May 1, 1951 to April 30, 1952, the Dental Clinic admitted 13,007 patients. Of this number, 6,110 were new patients and 6,897 were former patients readmitted. There were 2,319 patients referred from the hospitals of the Medical Center; 756 teachers and students from Columbia University; 300 Medical Center personnel; and 9,632 from other sources.

The over-all total of clinical procedures will reach a higher level as the result of larger third- and fourth-year classes. The impact of increasing the registration was first felt this year in operative dentistry.

DIVISION OF OPERATIVE DENTISTRY

Professor Carl R. Oman has continued to direct the activities of this field of clinical dentistry. Drs. Kenneth Deesen and Richard Fowler have joined the teaching staff as Assistants in Dentistry.

This Division has continued its active interest in clinical research. The project, "A Quantitative Evaluation of Dental Pain by Means of the Digital Plethysmograph," has been continued by Drs. Harold Sherman and Joseph E. Fiasconaro. This project represents the true spirit of faculty integration as shown by the wholehearted cooperation given by Professor Harry Grundfest and the Department of Neurology.

These same two workers are carrying on projects relating to the evaluation of high potency local anesthetics and a comparative evaluation of the cavity sealing properties of self-curing resins. They are cooperating with Professors Oman and Edward A. Cain, Jr. in a project to study the cavity sealing prop-

erties of amalgam filling. Dr. Neal W. Chilton of the School of Public Health has contributed to the statistical analysis required by these projects in clinical research.

DIVISION OF ORAL SURGERY

The retirement of Adolph Berger, Professor Emeritus, was deeply regretted. The responsibility for the Division has been assumed by Dr. Joseph Schroff, William Carr Professor of Oral Surgery. Professor Schroff has been a member of the Faculty since 1923.

The large number of patients seen in this Division provides ample material for clinical research. Every opportunity is taken to utilize this material by an extensive research program. This program, while reported from oral surgery, represents extensive interdivisional and interdepartmental cooperation.

DIVISION OF ORTHODONTICS

This Division has functioned under the direction of Professor Arthur C. Totten.

While largely concerned with the teaching of postgraduate orthodontics, the Division provides a real need in undergraduate teaching. Many problems of the prevention and correction of simple malocclusion are the responsibility of the general practitioner. Undergraduate teaching in orthodontics is designed to give our undergraduate students an understanding of orthodontics and the skill to fulfill their responsibilities as general practitioners.

Efforts are being made to fulfill the responsibility of the Division in the field of study of growth and development. Every effort is made to provide clinical service as part of the crippled childrens' program, particularly for the cleft palate and cerebral palsied child.

The demand for postgraduate teaching in orthodontics has remained at a high level. The course leading to a Certificate of Training has been increased from fifteen to sixteen months. Nineteen students completed this course. Sixty-five students were provided instruction in other postgraduate courses.

The Department of Anatomy is continuing to cooperate with the Division in the study of the temporomandibular joint. A serial study of occlusion in mixed dentition is now in its fifth year. A project to study the effect of orthodontic appliances on the caries rate in children is now in its third year. Other research projects include a study of occlusion of twins, and the Division is cooperating with the Department of Pediatrics in a study of Cooley's Anemia.

DIVISION OF PEDODONTICS

During the leave of absence granted to Professor Ewing C. McBeath, Professor Solomon N. Rosenstein assumed the direction of the Division of Pedodontics.

The Division has continued to direct its teaching towards prevention of dental caries, preservation of tooth structure and the management of the child patient. Ninety children were admitted to the Pedodontics Clinic and the number of visits totaled nine hundred and ten.

This Division has undertaken an extensive program in the field of dental care for the cerebral palsied child. This program, sponsored by the Cerebral Palsy Society, is organized in two parts, a Service Clinic to provide immediate dental care and a fellowship program to provide teaching and research. Two fellows have been appointed and will serve for two years. Their research is directed toward developing methods of therapy that will provide for the dental needs of these children. It is hoped that as methods are developed, the facilities of the Clinic can be increased to provide better dentistry for more children.

The Division provided non-credit instruction to two foreign graduate students from the School of Public Health.

Research activities include continued collaboration with members of the Pediatric-Sloane Study for relation between pre-natal disturbances and malformation in infants, tooth conservation studies, and efforts to determine normal ranges of variation in tooth development and eruption.

DIVISION OF PROSTHETICS

Under the direction of Professor Gilbert P. Smith undergraduate teaching has required the undivided attention of the prosthetic staff for the academic year. With a reduced staff and an increased teaching load, it was necessary to rearrange the schedule to permit the most economical use of staff time and distribute the load evenly through the three trimesters. The change in schedule, as worked out by Professor Hunt, Director of the Clinic, advanced the teaching of prosthetic and crown and bridge technique courses in the sophomore year, thereby freeing time in the third trimester for instructors to be assigned to other courses.

A major addition to the teaching assignments of the Prosthodontia Division is the portion of the oral anatomy course covering dental morphology. Dr. Howard A. Arden assumed leadership of this course and has been ably assisted by other members of the crown and bridge staff. This gives a close integration between the oral morphology and crown and bridge courses that will result in improved correlation of the two subjects.

This Division carried the largest teaching load of any single division of clinical dentistry. The reduction in staff already experienced and the further reduction anticipated this year will pose serious problems if the high standards of teaching are to be maintained. Satisfactory replacements are difficult to obtain and the present staff is teaching at maximum capacity.

DIVISION OF STOMATOLOGY

This Division composed of the sections of Periodontia, Diagnosis and Radiology is directed by Professor Lewis R. Stowe. The section of Periodontia is headed by Professor Frank E. Beube. The section of Diagnosis and Radiology is directed by Professor Edward V. Zegarelli.

Quarterly staff meetings, held jointly with the periodontia staff of the Beth Israel Hospital in Boston, have provided an opportunity for discussion of the many controversial problems in this field of dentistry. These discussions have led to research projects being conducted jointly by this school and the Boston Beth Israel Hospital. These studies are concerned with the regrowth of the dental papillae and the possibility of reattachment in supra bony pockets.

Undergraduate teaching has been strengthened by the addition of seminars of periodontal histopathology to the fourth-year schedule.

Members of the staff presented fifty-one lectures and clinics to various dental societies and other schools throughout the United States.

The section of Diagnosis and Radiology has continued its program of staff meetings in which men from other fields are invited to participate. These guest speakers included Professor Sidney C. Werner of the Department of Medicine, Dr. Henry Jaffe of the Hospital for Joint Diseases, Professor Carmine T. Vicale of the Department of Neurology and Professor Charles A. Ragan, Jr. of the Department of Medicine.

Dr. John Morrissey of the Veterans Administration has worked in the Diagnosis Clinic and has continued the research on periapical fibro-osteomas.

Dr. Lawrence Heiman, also of the Veterans Administration, has been selected as the first of a series of Veterans Administration dentists who will be assigned to the Diagnosis Clinic. These men will aid in the functioning of this Clinic while receiving training to improve their service to the Veterans Administration.

The staff has continued to provide consultant service to the Veterans Administration. Professors Edward Zegarelli and Joseph A. Cuttita have been particularly active in the teaching program of the Veterans Administration.

An active clinical research program is being conducted. Much of this work is in cooperation with other divisions of the Department of Dentistry.

RESEARCH LABORATORY

The increased activity of this Laboratory, directed by Professor Barnet M. Levy, again illustrates the need for additional space. Seven full-time and five part-time people are now using the one laboratory available to the Department.

From the inception of our present research program the policy of the Laboratory has been one of cooperation. Facilities to the fullest extent pos-

sible are available to members of the staff interested in dental research. Over 400 specimens were processed during the past year.

The function of this Laboratory is primarily one of basic research. Work has continued in the fields of experimental embryology, radiology, and histochemistry. The cooperation shown by the Departments of Anatomy. Radiology, and Biochemistry has greatly facilitated the program of basic dental research.

Financial support has been received from the American Cancer Society, the United States Navy, the United States Public Health Service and other grants-in-aid.

DIVISION OF DENTAL HYGIENE

Courses for dental hygienists under the direction of Professor Frances R. Stoll registered eight candidates in the Class of 1952 and fifteen candidates in the Class of 1953. At the time of this report, twelve candidates have been accepted for the class entering in September, 1952.

Two clinics were in operation during the year to provide practice experience in dental prophylaxis. The Dental School Clinic was supervised by Miss Barbara Fink. A total of 807 patient visits were recorded in this clinic. The clinic at 15 Amsterdam Avenue was supervised by Miss Rosalie Greco. Three hundred and sixty-five children were given dental prophylaxis and dental health instruction. These patients were from the Woodycrest Home, Public School 141, and St. Mary's Home.

The program of assigning senior students to public schools was continued. Those schools selected have dental health programs in progress. Each student received 75 hours of observation and supervised teaching at primary, intermediate, and higher elementary levels.

The raising of dental hygiene teaching to university status has required an intensive recruitment campaign. The results of this are now being felt in the larger number of applicants.

During the year, notice of the available material for guidance counselors was published in *Career Index* of Moravia Press and in *Highlights* published by the Guidance Department of the State Education Department. These sources have been instrumental in placing guidance material in the hands of interested deans, counselors, and teachers in colleges and high schools.

Scholarship aid is provided by the Dental Hygienist Alumnae Association, the Commonwealth of Canada, and the Government of Puerto Rico.

It is interesting to note that four of the seven girls graduated last year have accepted teaching positions, two as Assistant Directors of Departments of Dental Hygiene in other universities. One student has been accepted for next year's class at the request of another university. This student is to be trained to direct its Department of Dental Hygiene.

The steady growth of this Division is highly satisfactory. The change from

a two-year course to one leading to a degree necessarily required a transition period. The high quality of training and the demand for the graduates should soon see the Division operating at maximum capacity.

TEMPORO-MANDIBULAR JOINT CLINIC

This clinic, through its close cooperation with other departments, is filling a need long felt in dentistry. The problems of pain and loss of function of the temporo-mandibular joint are poorly understood and efforts to understand this disabling condition have produced few results. It is hoped that this combined approach to the problem will bring forth much needed information.

The Temporo-Mandibular Joint Clinic, under the direction of Dr. L. Laszlo Schwartz was able through close dental-medical integration to extend its activities during the academic year.

Members of the Clinic are Professor Jack Budowsky, Division of Oral Diagnosis and Roentgenology; Dr. Austin H. Kutcher, Division of Research; Dr. Stanley L. Lane, Division of Oral Surgery; Professor John J. Lucca, Division of Prosthetics; Dr. Solomon L. Katz, Division of Orthodontics; and Dr. Seymour Zeff, Division of Oral Surgery.

Cooperating with this group were Dr. Max Cohen, Psychoanalytic Clinic for Training and Research; Dr. Jules J. Waltner, Department of Otolaryngology; Professor Charles A. Ragan, Jr., Department of Medicine; and Dr. Charles T. Ryder, Department of Orthopedic Surgery.

One hundred and ten patients were examined at the Clinic during the year. Diagnostic findings and suggested treatment were communicated to referring dentists and physicians. Patients were treated at the Clinic. Postgraduate students in oral surgery and senior undergraduates received instruction from clinic members.

The following studies are being conducted by the groups: the relation of emotional factors to temporo-mandibular joint symptoms, by Dr. Max Cohen; the use of tolserol in the treatment of temporo-mandibular joint, by Dr. Stanley Lane; temporo-mandibular joint symptoms, a preliminary report of a clinical study, by Dr. L. Laszlo Schwartz.

Four seminars were conducted by the Clinic at which the following speakers presented papers: Professor Barnet M. Levy, Professor Ragan, Dr. Ryder, and Professor Harry H. Shapiro of the Department of Anatomy.

DEPARTMENT OF DERMATOLOGY

Professor Carl T. Nelson, Executive Officer

During the past academic year the removal of the laboratories and offices of the Department of Dermatology to their new location on the sixteenth

floor of the College was completed. With the opening of the recently constructed Serological Research Laboratory the various sections of the Department are, for the first time, housed as a unit on one floor. This has greatly facilitated the integration of departmental laboratory activities.

Professor Lewis B. Robinson and Dr. Bernard O. Dodge retired after many years of service in the Department. Dr. James H. Trimble was granted a military leave of absence from September 1, 1951, and Dr. Harry Van Velsor left on June 10, 1952 to enter the United States Public Health Service. Dr. Justina H. Hill was assigned to the Department by the Division of Venereal Diseases of the United States Public Health Service, effective March 1, 1952. As a Research Associate she will have general supervision of the Serology Laboratory and its investigative work on the treponemal immobilization test for syphilis. The facilities of the Department were also extended to three visiting scholars for varying periods of time during the past year. These included Dr. Arturo Carrion, San Juan, Puerto Rico; Frederic Raubitschek from the Hadassah University Hospital in Israel; and Dr. Fethi Tegok, Ankara, Turkey.

The undergraduate teaching program for fourth-year students has been modified to permit two Friday morning clinical sessions each month at the United States Public Health Service Hospital, Stapleton, Staten Island. The dermatology service of that hospital is large and affords a wide variety of the type of clinical material no longer common in most hospitals. This is particularly true of the venereal diseases in early and acute stages. These teaching sessions have been under the able direction of Dr. Benjamin Chester, assisted by Dr. Charles F. Post. The success of this program warrants its continuation despite the travel distance involved for the students.

The annual syphilis symposium for fourth-year students was held on April 25th and 26th, 1952. In addition to the lectures and demonstrations presented by various members of the Department, four visiting lecturers participated in the symposium. These were Dr. Herbert Koteen and Dr. Bruce Webster of the New York Hospital; Dr. Donald Widelock of the New York City Department of Health; and Dr. Edwin P. Maynard, Jr. of the State University of New York, College of Medicine in Brooklyn.

The training program for graduate students and residents in dermatology has been continued as previously organized. Supplementing the courses regularly offered, a series of special lectures on the clinical aspects of radiotherapy was given by Professors Vincent P. Collins and Harold W. Jacox of the Department of Radiology. These lectures served the valuable purpose of correlating theoretical radiologic physics with the practical applications of the subject. The weekly seminars for graduate students and residents were held under the direction of Professors Paul Gross and Beatrice M. Kesten. During the year special seminars were conducted by Dr. David

Reisner, formerly Medical Supervisor of the Bureau of Tuberculosis of the New York City Department of Health; Dr. William T. Anderson, Hanovia Chemical Company, Newark, New Jersey; and Professor Leonard T. Chavkin, Columbia University College of Pharmacy. The curriculum also included a series of seminars for graduate students, residents and junior staff members at the Flower and Fifth Avenue Hospital. This was a cooperative undertaking initiated by Dr. Eugene Traub in which dermatologists from several institutions participated. The members of this Department who took part in these exercises were Professors George C. Andrews, Leslie P. Barker, J. Lowry Miller, Carl T. Nelson and Dr. Royal M. Montgomery. The fortnightly departmental staff conferences held during the academic year were organized and conducted by Dr. Milton B. Sloane assisted by Dr. Margaret H. Hannigan. The clinical material presented proved to be of unusual interest to members of the staff and visiting physicians.

The investigative activities of the Department have continued at a high level and have covered a wide variety of subjects. Professor Andrews has continued his studies on the use of hormones in the management of acne vulgaris and the applicability of various methods of treatment for angiomas. With Dr. Anthony N. Domonkos he has also undertaken an investigation of the effects of strontium 90 applied to the skin. Professor Rhoda W. Benham and Dr. Margarita Silva have extended their analysis of the nutritional requirements of the dermatophytes, supported by a grant from the United States Public Health Service. Professor Benham has also completed a comprehensive study on the genus *Beauveria* and this work is now ready for publication. Professor Gross has been investigating the pH and alkali neutralizing properties of the skin in certain types of eczematous eruptions. Professor Miller, with Dr. Meyer H. Slatkin and Dr. Marvin Brodey, has completed a survey of the reliability and clinical applications of the treponemal immobilization test in various stages of syphilis. In conjunction with Dr. Van Velsor, Professor Miller has also continued the long-term study of the topical use of antibiotics in certain dermatoses.

Professor Kesten has begun an investigation of the host-parasite factors involved in chronic monilial infection. Some of the laboratory aspects of this problem have been explored in collaboration with Mrs. Julia T. Weld of the Department of Pathology. Professor Kesten has also extended the follow-up survey of patients with allergic eczema and, with Dr. Slatkin, has continued the study of the role of light sensitivity in certain dermatologic conditions. Professor Barker recently completed a clinical study of congenital ichthyosiform erythroderma which will be published soon. Professor Nelson has made further observations on the effects of corticosteroids on tissue electrolyte changes during anaphylaxis. With Dr. Ralph Teicher he has also studied the problem of abnormalities of calcification in patients treated with ACTH

and cortisone. Professor Machacek, with Dr. Hannigan and Dr. Edward W. Wilson, has been investigating the histological variations of tumors occurring after excessive irradiation of the skin.

Dr. Helen O. Curth has extended the study of the relationship of acanthosis nigricans to cancer and, in collaboration with Dr. William Curth, has investigated the problem of pseudo acanthosis nigricans. Dr. Slatkin has undertaken a study of the blood and spinal fluid levels attained by the use of dibenzyl penicillin in the treatment of different stages of syphilis. With Dr. Alfred Gallinek of the Department of Neurology, he has also continued the clinical survey of patients with neuro-syphilis who have been followed for long periods of time after treatment. Dr. Wilson is carrying out a critical evaluation of the derivatives of isonicotinic acid in various forms of tuberculosis of the skin.

Seventeen papers on clinical and experimental subjects were published from the Department during the year. The members of the staff have also continued to be active in the proceedings of local and national dermatological societies. At the Academy of Dermatology meeting the course in radiotherapy of skin disorders was again conducted by Professor Andrews assisted by Dr. Domonkos. Professor Nelson presented the course on viral and rickettsial diseases of the skin at the same meeting. Dr. Domonkos also gave a series of four lectures on X-ray and radium therapy in dermatology to the staff of the Department of Radiology at the Francis Delafield Hospital.

DEPARTMENT OF MEDICINE

Professor Robert F. Loeb, Executive Officer

The World Health Organization has defined health as "a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity." A number of medical educators and certain foundations have recommended a reorientation of medical education to prepare the medical profession to fulfill its responsibilities in this concept. Toward this end suggestions are currently being made that premedical students be trained in the social sciences, if need be at a reduction of preparation in the basic sciences. It is advocated by some that the social sciences should also be included in the undergraduate medical curriculum. Another move would introduce into medical schools home care programs in which medical students would participate even in their first year. It is contended that these devices will serve to raise the quality of medical care by furnishing the medical student with a better understanding of the patient in relation to his social setting and by presenting the student with a preview of the practical aspects of the care of the sick in the home. It is expected that these programs ultimately will aid

in the resolution of the socio-economic maladjustments of mankind, at least in so far as they bear on the broad interpretation of "health" mentioned above. There is also being urged upon medical schools the establishment of curricula for the training of "general practitioners" who will be expected to encompass and practice the broadest spectrum of medical care.

In looking to the future of medicine it would be unfortunate not to give consideration to the fact that the health of man, in a less presumptuous sense, and medical care have advanced more in the past fifty years than in all preceding time. Few would deny that the unequalled progress of the first half of this century stems primarily from the advances of medical science and their translation to the prevention of disease and the care of the sick through the media of medical education and public health practice. Moreover, the backward areas of the world suffer less from lack of available knowledge than from lack of physicians trained in modern schools of medicine and lack of facilities in which to apply the newer knowledge.

The Department of Medicine has been deeply concerned with the trends in medical education and after considerable discussion during the past year, general agreement has been reached that the standards of medical education in respect to internal medicine at Columbia should be maintained at the highest possible scientific level and that this will in the long run best serve medical care in the community. It is believed that the incorporation of the social sciences would be of doubtful value at this time, first, because these disciplines have not yet reached a definitive maturity which can find tangible application to medicine, and second, because it seems unwise to sacrifice the limited and precious time in order to observe those aspects of the practicalities of home care which are more effectively mastered by the application of common sense and intuition in the course of long continued responsibility for the care of patients. Finally it is agreed that the Department of Medicine should set as its goal the training of students for the highest type of modern scientific practice. For surely it is anachronistic to believe that the level of patient care in this country will be raised by returning to an era in which a single physician was expected to have competence in all aspects of medicine, in spite of the fact that there remain areas in which facilities for the practice of modern medicine are virtually non-existent.

It is our impression that the major defects in medical practice among recent graduates in the United States do not emanate from a lack of appreciation of socio-economic problems or of the role of emotion in health and disease. Rather, the defects arise from lack of adequate facilities, i.e., hospitals and laboratories necessary for the study and care of the sick in their own communities; lack of time to evaluate patients and their environment by means of adequate histories and the complex studies essential for a correct total appraisal of the individual; or lack of dedication to the ideals of medi-

covered from his illness sufficiently to be back in September. The death of tioners to sacrifice the application of their training for more material considerations. These defects will not be rectified by the introduction of sociological studies into the medical curriculum, nor by undergraduate home care programs, nor by the training of medical students to become "general practitioners" in the old connotation of that term. It is our belief that the function of the well-trained internist is to be the family practitioner and not the general practitioner. His role is to know the patient and his environment, to care for him in health and illness and to guide him when his problems require special skills. On the other hand, it is our firm belief that the introduction of these programs will further dilute a curriculum already heavily taxed by the rapid growth of basic scientific knowledge essential for the care of the sick individual and for the continuing intellectual growth of the physician during his professional career.

No major changes have been made in the undergraduate curriculum in medicine. The assignment of lectures to be given by outstanding fourth-year students to the third-year class with a mentor from the Faculty present has again been judged a useful pedogogic device. The Group Clinic has completed its sixth year and it is gratifying to see that the pattern set here in outpatient teaching is being adopted by numerous university clinics. During the past year a number of distinguished visitors from foreign lands and this country have lectured or participated in the Saturday clinics. These have included Sir Robert Robertson, Professor J. Harold Burn, Drs. Carl Martius, Astrid Fagraeus, John Brobeck, Lawrence Young, Harris Isbell, and others.

Professors Robert C. Darling and William B. Snow have become members of the newly created Department of Physical Medicine and Rehabilitation. Professor Arthur J. Patek has returned, having resigned from Western Reserve University where he was Professor of Medicine. Dr. Charles H. Duncan has resigned to become Assistant Professor of Medicine at the University of Louisville. Drs. William B. Sherman and Hamilton Southworth have been promoted from Assistant Clinical Professor to Associate Clinical Professor. Drs. George A. Carden and Shirley C. Fisk have been promoted from Associate to Assistant Clinical Professor. Dr. Alvan L. Barach has been advanced from Associate Professor of Clinical Medicine to Clinical Professor of Medicine. At Bellevue Hospital, Dr. Edward P. Eglee has been promoted to Clinical Professor from Associate Clinical Professor and at Roosevelt Hospital, Dr. Norton S. Brown has become Assistant Clinical Professor.

During the past year a number of fellows from foreign countries have been guests of the Department of Medicine. These include Drs. Sidney W. Stanbury and Oliver Garrod, Rockefeller Foundation Fellows from England; Drs. Henry O. Heinemann and Jacques Lammerant, Fulbright Fellows from Holland and Belgium; Dr. Jean Lochart from France; and Drs. Ronald W.

Lamont-Havers and de Guise Vaillancourt, Fellows of the Canadian Rheumatism Foundation. Also, Dr. William A. Briscoe has been a fellow at Bellevue Hospital from the London Postgraduate Medical School. There have also been active fellows from the National Research Council, the Damon Runyon Memorial Fund, the United States Public Health Service, the New York Heart Association, the John and Mary R. Markle Foundation, the American Cancer Society, and the American Arthritis and Rheumatism Foundation in this country.

It is a great satisfaction to be able to report that a gift to the Department and one to the Medical Service of the Presbyterian Hospital has made it possible to supplement salaries of a number of full-time men. With generous support from a large number of private and governmental agencies, it has been possible for members of the Department to carry on an active program of research in widely diverse fields of considerable importance. The Department is still seriously handicapped by limitations of space essential for the full exploitation of research programs under way. Also it should be pointed out that the laboratory space for research activities of the Columbia staff at Bellevue Hospital and the Goldwater Memorial Hospital are wholly inadequate for the research in these institutions.

During the past year Professor Irving M. London has continued work in the fields of porphyrin, protein and cholesterol metabolism. Studies on the enzymatic mechanisms involved in heme synthesis have been facilitated by the finding that synthesis of heme in vitro can be demonstrated in non-intact immature erythrocyte preparations. The optimal conditions for this synthesis, the effects of various metabolic agents, such as folic acid, vitamin B_{12}, and lead, and the cellular constituents concerned with heme synthesis are under investigation. Further studies have been concerned with the preparation of isotopically labelled porphyrins for use in the determination of their role in the biologic origins of bile pigment. Studies on the metabolism of hemoglobin and bile pigment and on the life span of the erythrocyte in *polycythemia vera* are being extended. In continuing the investigation of lipid metabolism in normal and pathologic states, studies are in progress on the rates of turnover of serum and erythrocyte cholesterol and phospholipid in familial hypercholesterolemia with xanthomatosis. In conjunction with Dr. Helen M. Ranney, Professor London has continued studies on the capacity of various tissues to form antibodies in vitro. It has been established that the spleen, bone marrow, lung, and liver are capable of participating in the antibody response.

Professor John V. Taggart has continued his studies on the metabolic aspects of active transport in the kidney, with special emphasis on the tubular mechanism which is responsible for the excretion of such substances as p-aminohippurate, diodrast, and penicillin. Since these diverse compounds

are all carboxylic acids, it has become important to establish the carboxyl group as the one through which they interact with certain cellular components of the transport mechanism. This has been partially achieved through the synthesis and testing of a number of derivatives of p-aminohippurate in which other potentially reactive groups have been blocked by chemical substitution. More recent observations with isolated enzyme systems suggest the possibility that Co-acetylase represents the definitive cellular component involved in this excretory mechanism. Current studies are directed toward the isolation of the specific renal enzymes. Professor Gilbert H. Mudge, with Dr. Sidney W. Stanbury of Manchester, England, has continued his studies on the mechanisms of electrolyte transport across cell membranes. Earlier studies have shown that the transport of strong cations depends on aerobic metabolism. A possible lead into the intrinsic cellular mechanisms was furnished by the demonstration of apparently chemically bound potassium in the renal cortex. This phenomenon has been analyzed further by studying comparable phenomena in a cell-free system of mitochondria. Potassium exchange of these cell components is being examined in detail and the results to date are gratifying in that the general characteristics of this system are remarkably similar to the intact-cell system previously studied.

Professor Karl Meyer has continued to study components of the ground substances of connective tissue. These studies at present have as their object the elucidation of the enzyme systems which break down the mucopolysaccharides into oligo- and monosaccharides, the determination of the structure of these oligo- and parent polysaccharides by methods of carbohydrate chemistry, and the elucidation of the function of the various mucopolysaccharides in physiology and pathology. This work is being carried out in collaboration with Dr. Bernard I. Weismann and Mr. Alfred Linker.

Professor Charles A. Ragan and his associates, including Drs. Felix E. Demartini, Ralph A. Jessar, Ronald W. Lamont-Havers, and Albert W. Grokoest, have continued studies on rheumatoid arthritis with special reference to the nature of the host response to local tissue trauma and the influence of cortisone on this response. They have also carried on studies concerning the mechanism of action of salicylates. Professor Karl Meyer has participated in certain phases of the work, as have Professor Raphael Lattes and Dr. J. Wallace Blunt of the Department of Surgery and Professor Harry M. Rose of the Department of Microbiology. With the latter, Professor Ragan's group has been extending studies on the diagnostic hemagglutination reaction for rheumatoid arthritis developed by Professors Rose and Ragan. Long-term studies of the value of ACTH and cortisone in rheumatoid arthritis are continuing. Dr. Edward E. Fischel has demonstrated the inhibition of the anamnestic reaction by cortisone, further supporting the view that this

hormone inhibits the synthesis of antibody protein. With Professor Elvin A. Kabat of the Department of Microbiology and Dr. Herbert Stoerk of the Merck Institute, Dr. Fischel has shown that cortisone inhibits both granuloma formation and antibody production when antigens are injected with Freund's adjuvant. With Professor Meyer, Dr. Fischel has studied the antigenic reactions of pig connective tissue and pig serum. Dr. Fischel and Dr. Charles A. Frank have continued their participation in the American and British study of evaluate therapy in acute rheumatic fever.

Professor Michael Heidelberger, in collaboration with Professors Samuel Graff of the Department of Biochemistry and Cushman D. Haagensen of the Department of Surgery, has shown that in the antisera to the factor causing mammary carcinoma in mice, repeated absorption with milk proteins or breast tissue extracts of another strain of mice fails to remove antibodies to the milk factor. With Professor Heidelberger, Dr. Otto G. Plescia and Mr. Myron A. Leon have been continuing the fractionation of pig complement by various procedures and have obtained combinations of components which should be useful in the development of urgently needed quantitative methods for the analytical estimation and characterization of the components of complement. Mr. Harold Markowitz has separated the hydrolysis products of the specific polysaccharide of Type 1 pneumococcus into acidic and basic portions by means of exchange resins, and a crystalline derivative of a basic fragment has been obtained but is not yet characterized. He has also identified glucose as a component of the nitrogen-free specific polysaccharide of Type 18 pneumococcus. Mr. Arnold Powell has made dinitrophenyl derivatives of crystalline and denatured egg albumins and is exploring their utility in identifying differences between the two forms. He is also studying the combination of the -SH groups of crystalline egg albumin with iodoacetamide in an effort to evaluate the importance of the -SH groups in the immunological specificity of the protein. Dr. Daniel C. Larson has obtained studies on antibody formation in different types of leukemia and has demonstrated that cortisone decreases the augmented antibody response in patients with acute leukemia, whereas it does not depress antibody formation, at therapeutic levels, in normals or patients with rheumatoid arthritis.

A study of the renal functional effects of l-epinephrine and l-norepinephrine made by Professor Stanley E. Bradley in collaboration with Drs. James F. Nickel and Cheves McC. Smythe has revealed that both agents depress sodium and potassium excretion. Similar effects have been obtained with angiotonin, S-methyl isothiourea, and neosynephrine but not with high spinal anesthesia or pitressin infusion. An investigation of the changes in renal function during salt deprivation in patients with uremia has been completed in collaboration with Dr. Nickel. With Dr. Edgar Leifer and Dr. Nickel a method employing radioactive sodium and potassium has been developed for

evaluating the delay of urine flow within the kidney. Drs. Smythe, Henry I. Heinemann, and Paul A. Marks have made a study of hepatic blood flow in dogs before and after hemorrhage and the pyrogenic reaction. Dr. Nickel and Dr. Willoughby Lathem are making a study of the effect of a plasma substitute known as PVP on protein excretion in patients with proteinuria. Dr. Lathem and Mrs. Katherine Baker have set up a chromatographic method to study the pattern of excretion of amino acids in normal persons and patients with renal disease before and after loading with amino acids. A method of measuring splanchnic blood volume and the distribution of hepatic blood flow has been developed in collaboration with Drs. Marks and Heinemann and Mr. Jay Meltzer of the third-year class.

During the past year Professor George A. Perera has continued studies dealing primarily with hypertensive vascular disease. The history of 100 patients, followed from before the onset of hypertension until death, was summarized. This was the first series of this kind. It was also demonstrated that unilateral renal disease gives rise to a characteristic accelerated hypertensive pattern which may serve as a diagnostic aid and implies differences in mechanism from the usual picture of essential hypertension. Studies have also been in progress to evaluate hexamethonium compounds, hydrazinophthalazine and pyrogens in the management of severe hypertensive disease. With Dr. Joseph W. Jailer, Professor Perera has been engaged in studying the metabolic effects of Compound B (corticosterone) and in examining the chromatographic partition of urinary ketosteroids in hypertensives. With Dr. Kermit L. Pines, studies on the effect of thiocyanates on electrolyte excretion in normotensives and hypertensives are being concluded and the effects of certain adrenal extracts in hypertension studied. Together with Dr. Stuart W. Cosgriff and Professors Kenneth B. Turner and Alfred Steiner, the action of heparin in angina pectoris is being investigated. Thus far no beneficial effects such as have been reported by others have been observed.

Professor Abbie I. Knowlton and Dr. Emily N. Loeb, in conjunction with Dr. Herbert Stoerk of the Merck Institute, have continued to study the effect of cortisone acetate and of desoxycorticosterone acetate (DCA) upon the intact as well as the adrenalectomized rat in the presence of high and of low sodium regimens.

Dr. Marcel Goldenberg, with Dr. Irving Serlin, has continued studies on urinary excretion of adrenalin and nor-adrenalin in pheocyromocytoma. A purely chemical diagnosis of chromaffin tissue tumors now appears feasible. Also the identification of biological degradation products of nor-adrenalin has been attempted. In addition, Drs. Goldenberg and Serlin have studied, in animals, DOPA-decarboxylation inhibitors. Dr. Goldenberg is also carrying out experiments directed at the production of persistent hypertension in

rats by the prolonged administration of noradrenalin. During the past year Dr. Henry Aranow, Jr. has been evaluating the new long-acting anti-choline esterase drug, octamethylpyrosphoramine, in the management of myasthenia gravis. With Dr. Goldenberg he has been studying the value of a new adrenergic blocking drug, regitine, as a substitute for the benzodioxane test in screening hypertensive patients for the presence of pheochromocytoma.

The acute effects of renal function of intravenously administered microcrystals of cortisone and DOCA have been studied in the adrenalectomized dog by Dr. Oliver Garrod and Mr. George Cahill and Miss Sylvia Davies of the third-year class.

During the past year experiments were conducted in the field of thyroid disorders by Professor Sidney C. Werner. An investigation was made as to whether Graves's disease represents hyperthyroidism or hyperpituitarism. The evidence suggests the thyroid origin of hyperthyroidism rather than a pituitary-mediated mechanism. A study has been made of the mechanism of production of progressive exophthalmos. It has been demonstrated that repeated "test doses" of I^{131} exert therapeutic effects in hyperthyrodism. A clinical and physiologic study of levothyroxine given by mouth and by vein is in progress. Clinical and laboratory evidence suggest that it is as effective as is whole gland given by mouth. Five to six year follow-up studies in patients with hyperthyroidism treated with I^{131} are in progress.

Professor Joseph W. Jailer in his laboratory in the Department of Obstetrics and Gynecology determined the patterns of urinary excretion of 17-ketosteroids in response to cortisone in adrenal virilism due to hyperplasia and adrenal carcinoma. This has furnished a useful method of differentiating these disorders. Similar differentiation seems possible between patients with Cushing's syndrome resulting either from striking differences in sodium excretion in patients with adrenal virilism and Cushing's syndrome following ACTH administration. With Professor Seymour Lieberman of the Department of Obstetrics and Gynecology, Professor Jailer has developed a simplified method for column chromatographic separation of the various components of the 19-ketosteroid complex. He has also extended his studies on the pituitary gland of newborn in its capacity to respond to stress.

During the past year Professor Joseph C. Turner has initiated studies of nutrition in the micro-crustacean, Daphnia, with particular reference to hemoglobin metabolism. Elimination of the natural microflora of the intestine by the use of antibiotics appears to result in loss of reproductive activity in Daphnia. It has been possible to subject individual Daphnia to the action of at least eight antibiotics in combination, or in succession, without destroying the animals, and it is hoped that from this will develop a simple method for obtaining a "germ-free" population that will perhaps be generally applicable to the study of small aquatic animals. With Professor Turner, Dr. Ranney

has continued her studies of mechanisms of anemia in a variety of disorders employing the Ashby technique. Dr. Richard J. Cross has modified methods for measuring ketone bodies in blood and urine to obtain greater accuracy. A series of experiments is in progress to determine the effect of the intravenous administration of members of the citric acid cycle on the rate of metabolism of ketone bodies.

In a study of pulmonary emphysema two new techniques were developed by Professor Alvan L. Barach which further facilitate the use of diaphragmatic breathing in these patients and, thereby, reduce dyspnea on exertion. One technique is negative pressure breathing, which decreases pulmonary over-distention and lowers peripheral venous pressure and viscero-diaphragmatic breathing thereby automatically initiating diaphragmatic breathing by upward pressure of the viscera on the diaphragm. In the head-down position this results in a marked fall in pulmonary ventilation comparable to that produced by inhalation of oxygen. In collaboration with Dr. Gustav J. Beck and Dr. Eugene Seanor, the exsufflator, devised by Professor Barach and his associates, was established as an effective method of eliminating bronchial secretions in some patients with asthma, pulmonary emphysema, bronchiectasis and poliomyelitis. It was also found beneficial in management of certain patients with massive pulmonary atelectasis. A study of antibiotic therapy in chronic broncho-pulmonary disease, with Dr. Hylan A. Bickerman, Professor Harry M. Rose of the Department of Microbiology, and Dr. George W. Melcher, Jr., at the Goldwater Memorial Hospital and the Columbia-Presbyterian Medical Center, indicated that marked benefit and also certain untoward effects may follow prolonged treatment.

Dr. John R. West, in collaboration with Drs. John A. Wood and Anthony T. Ladd, and Sheldon Levin from the Department of Surgery, has extended his studies on pulmonary and cardiocirculatory function in patients with chronic rheumatic heart disease. This group in conjunction with Dr. Samuel Powers of the Department of Surgery has also made comparative simultaneous measurements of cardiac output with the Fick method and the dilution technique, employing Na^{24} as the test material, with apparatus designed by Dr. Powers. Drs. West and Wood are continuing their attempt to devise polarographic techniques for the quantitative determination of oxygen in whole blood. Professor Robert L. Levy and Dr. James A. L. Mathers have assessed the prognostic significance of the anoxemia test devised by Dr. Levy. Together with Professor John L. Nickerson of the Department of Physiology, Professor Levy and Dr. Mathers have observed the effects of various forms of exercise on the circulation as determined with the ballistocardiograph. Dr. John H. Laragh has been studying the effect of potassium choloride on the internal redistribution of sodium in hyponatremic states.

Professor Rene Wegria with Dr. Charles W. Frank and associates has com-

pleted studies on the acute hemodynamic effects of coronary artery occlusion in the dog as well as a comparison of chemical and physical methods for the control of ventricular fibrillation. Dr. Frank and Professor Wegria have also made comparative studies of the acute hemodynamic changes dependent upon the formation of small and large arteriovenous fistulae.

Professor Yale Kneeland, with Mrs. Katherine Price, has continued his studies on the influence of antibiotics on feline pneumonitis virus. Dr. Melcher has transmitted through several rat passages an icterogenic agent from human serum. This may become a useful means of determining the presence of certain icterogenic viruses. Professor Emeritus A. Raymond Dochez and Mrs. Price have been carrying on chemotherapeutic studies in relation to influenza virus. Professor William B. Sherman, with Mr. Joseph Portnoy of the Department of Mircobiology, has continued work on the blocking antibody in the serum of patients with ragweed hay fever. Professor Charles A. Flood has continued clinical studies in the field of gastroenterology. Dr. Cosgriff has extended his observations on the control of recurrent embolism in heart disease by anticoagulants.

Professor Alfred Gellhorn and his associates have shown that the cellular concentration of a deaminating enzyme determines the susceptibility of experimental tumors to growth inhibition produced by 8-azaguanine. It was also shown that following the administration of nitrogen mustard to partially hepatectomized rats there is an accumulation of nucleic acids in the regenerating liver cells. They have also made extensive observations on the cellular concentration of nucleic acids in normal and malignant cells. The results indicate that tumors and normal tissues may be precisely characterized according to content of nuclear desoxyribose nucleic acid. Evaluation of the place of nitrogen mustards, frolic acid analogs and steroid hormones and new drugs in the practical management of disseminated malignant disease continues.

Professor William H. Sheldon's atlas on the somatotyping of the adult male is in press. Studies of somatotyping women and children are in progress. A collaborative study with the Department of Zoology on the subject of twins has been initiated.

An active program of study continues in the field of interplay of psychological and physiological disturbances. This work has continued under the guidance of Professor George E. Daniels, Drs. John A. P. Millet and Kenneth Kelly of the Department of Psychiatry and their associates. The teaching program in psychiatry on the medical wards for the third-year clerks has proved highly gratifying in the past year.

The teaching program of the fourth-year clerks under the direction of Professor Dickinson W. Richards and J. Burns Amberson at Bellevue Hospital continues to play a most important part in the undergraduate program in

internal medicine. Research activities at Bellevue Hospital include the development by Drs. Richard T. Cathcart, Alfred P. Fishman and James Poppel of the dye-injection method for the measurement of cardiac output. Dr. Cathcart with Dr. Steg Radner of Lund, Sweden, and Dr. Philip Samet have been developing the technique of large artery and aortic pressure recording. Under Professor Andre Cournand, Professor M. Irene Ferrer, Dr. Rejane M. Harvey and Dr. Samet continued hemodynamic studies concerning the effects of acute and full digitalization and of exercise in different forms of cardiac disease at various stages of clinical compensation; the short- and long-term hemodynamic effects of commissurotomy in mitral stenosis; and the identification and appraisal of mechanical and myocardial factors in constrictive pericarditis Under Dr. John H. McClement and Dr. Aaron Himmelstein of the Department of Surgery, studies of alveolar ventilation-perfusion relationships, respiratory gas diffiusion, and pulmonary circulation, were completed in a variety of disorders characterized by disseminated lesions infiltrating the alveolarcapillary septa. The effects of cortisone therapy upon these disturbed functions were analyzed. Two new approaches to the problems of respiratory gas distribution and ventilation-perfusion relationships in the lung have been initiated by Dr. Alfred P. Fishman and Dr. William A. Briscoe. Drs. Mortimer and Richard Bader have investigated in blood and urine the fate of various "plasma expanders."

The Research Service at the Goldwater Memorial Hospital has completed its fifteenth year as an affiliated unit devoted to the field of chronic disease. It has advanced its program to improve the care of the patient with protracted illness, to augment education in chronic disease, and to conduct investigations in such diseases as cirrhosis of the liver, arteriosclerosis, hypertension, rheumatoid arthritis, nontuberculosis pulmonary diseases, and nephritis.

Professor Forrest E. Kendall and Alfred Steiner, with Professor Margaret Bevans of the Department of Pathology, have established a standardized biological system for the study of the production and regression of canine arteriosclerosis. They have shown that dietary choline does not influence the natural history of the arterial lesions in such dogs. Similar testing of inositol and estrogens is now under way.

Dr. Liese L. Abell and Professor Kendall have shown in cholesterol balance experiments in dogs that induced hypercholesterolemia is not due to decreased excretion. Dr. Frederick T. Hatch with Dr. Abell is investigating methods for determining fatty acids in serum. Dr. Irwin H. Mosbach with Professor Kendall has completed studies on the chemical composition of oxidized colloidal cholesterol solutions, using the methods of counter-current distribution and partition chromatography. Nine chemically distinct sterols have been identified for the first time in this reaction mixture. Radioactive tracers are

being used by Dr. Mosbach, Professor Kendall and Dr. Abell to study the role of cholesterol and oxidized sterols in the pathogenesis of arteriosclerosis. The fate of intravenously administered colloidal cholesterol has been determined in rabbits using cholesterol-C^{14} as a tracer. A colloidal cholesterol solution suitable for intravenous injection in dogs has been prepared and is being used for metabolism experiments.

Professor Arthur R. Wertheim with Drs. Gerald H. Eurman, Hatch, and Professor David Seegal are now completing the study on the effectiveness of the Kempner rice diet in primary hypertension. They have confirmed the opinion that the restricted sodium intake is the most important factor in the effectiveness of the regimen. A more palatable low sodium diet containing about 90 gm. protein has proved equally effective in lowering blood pressure. Dr. Hatch has found that drastic dietary fat restriction in patients with hypertension produces changes in the serum lipids which are highly variable from patient to patient. About one-fifth of these individuals develop lipemia and one-half show increases in the amount of Sf 12–20 lipoprotein.

Dr. Milton Mendlowitz and Dr. Eurman have clarified the limits of error of arterial temperature variation in the former's calorimetric method of blood flow determination. Dr. Eurman has devised a simple, objective auscultatory method for determining the digital blood pressure in man. Professor Wertheim with Drs. Mendlowitz and Eurman are testing, in suitable patients certain drugs known to lower blood pressure. As indicated above, in joint studies at the Presbyterian Hospital and the Goldwater Memorial Hospital, Professor Barach with Drs. Hylan A. Bickerman and Gustav J. Beck have perfected two devices which mechanically simulate a cough. Drs. Reuben M. Cherniack and Charles A. Gordon have studied the physiological effects of "mechanical exsufflation" on the experimental obstructive breathing in normal subjects and in patients with pulmonary emphysema and obstructive dyspnea.

During the past year Professor Charles A. Ragan, with Drs. Felix Demartini, Ralph A. Jessar and Ronald W. Lamont-Havers, has continued to use the available clinical material and facilities to evaluate forms of therapy in the rheumatic diseases. They are investigating the effects of the long-term treatment of rheumatoid arthritis with cortisone and adrenocorticotropic hormone. They have demonstrated that, contrary to current reports, the prolonged administration of terramycin is of no value in the treatment of severe rheumatoid arthritis. The group is also investigating the demineralization of bone seen with prolonged cortisone therapy; the possible value of estrogens, testosterone and strontium salts in the treatment of this iatrogenic disorder is being studied.

Professor Beatrice C. Seegal of the Department of Microbiology has been continuing studies of the cytotoxic nephritis produced in dogs by the ad-

ministration of specific anti-placenta serum. A colony of beagles in different stages of chronic nephritis is being followed to determine the natural course of the disease. Professor Arthur J. Patek has initiated further studies in liver disease. Dr. Henry Colcher, in association with the Gastroenterology Research Laboratory at the Mount Sinai Hospital, has found that in the gastric juice of the dog the sodium concentration shows an inverse relation with hydrogen ion concentration. Potassium is not secreted at a constant rate. In response to histamine stimulation there are changes in potassium concentration independent of acid secretion. Following the intravenous injection of a known carbonic anhydrase inhibitor there is reduction in acid secretion in canine gastric juice but there is no specific effect upon the secretion of either sodium or potassium. Dr. Colcher, in collaboration with Drs. Judith Nadell and Nell Kuhn, has observed similar changes in potassium concentration in the gastric juice of patients with pernicious anemia. Professor David Seegal is investigating the mechanism whereby the antigen antibody reaction leads to tissue damage.

During the past year a number of unusual distinctions have come to members of the Department, many of whom have, in addition, been invited to lecture at medical schools throughout this country and abroad. Professor Andre Cournand received the Phillips Memorial Award of the American College of Physicians and delivered the Battro Memorial Lecture in Buenos Aires. He also presented a report on the physiopathology of chronic cardiac failure in Brussels. Professor J. Burns Amberson received the Trudeau Medal of the National Tuberculosis Association and has been guest teacher at the Brompton Hospital for Chest Disease in London. Professor Dickinson W. Richards delivered the Lewis A. Connor Lecture of the American College of Physicians. Professor David Seegal served on the Panel for Chronic Disease of the President's Commission on the Health Needs of the Nation. Professor John V. Taggart addressed the McCollum-Pratt symposium in Baltimore. Professors George A. Perera and Rene Wegria addressed the Gordon Research Conference and Professor Perera gave the Alpha Omega Alpha Lecture at Boston University. He is also Secretary of the Section on Medicine at the New York Academy of Medicine. Professor Karl Meyer delivered the Claude Bernard Lecture at the University of Montreal. Professor Irving M. London became Associate Editor of the *Journal of Clinical Investigation.* Professor Stanley E. Bradley gave a series of lectures in England and France. Professor Michael Heidelberger was made President of the Harvey Society. He also received an honorary degree from the University of Strasbourg, France, and became Chairman of the Research Council of the Public Health Research Institute of New York. At the invitation of the Government of India, he attended the Indian Science Congress in Calcutta and gave numer-

ous lectures in India. Professor Loeb was appointed a member of the Science Advisory Committee to the President and the Office of Defense Mobilization. He was also reappointed to the National Science Board by the President. He received an honorary degree from the University of Strasbourg.

DEPARTMENT OF NEUROLOGICAL SURGERY

Professor J. Lawrence Pool, Executive Officer

A program of nine lectures on neurological surgery were presented to the fourth-year medical students. In addition, six lectures were given by Dr. Fritz Cramer to the graduate nurses at the Neurological Institute.

Research in psychosurgery was continued in conjunction with the New York State Psychiatric Institute staff. This research includes direct electrical recordings of the brains of psychiatric patients which have proved beneficial and have opened up fields of new information.

Cancer of the brain was studied in conjunction with Professor Margaret R. Murray of the Department of Surgery and Professor Alfred Gellhorn of the Department of Medicine. This involves testing biochemical substances such as guanazola in arresting tissue culture growth of glioblastoma multiforme. Enzyme studies have been carried out by Dr. Erich Hirschberg of the Department of Biochemistry. This is promising work and clinical application has already been started.

Studies are being continued by Dr. Lester A. Mount of direct pressure recordings from the carotid artery in the neck and from the smaller arteries of the surface of the brain. The latter has provided for the first time definite information concerning the pressure of the arteries of the brain itself and has already proved of great value in the treatment of intracranial aneurysms.

Dr. Thomas J. Bridges in conjunction with the Department of Anesthesiology is carrying out an intensive study of the effect of planned hypotension by the use of drug therapy for vascular lesions of the brain during operation. This has been of practical value and holds great promise for the future.

Dr. Joseph Ransohoff is studying the use of ventriculo-peritoneal and pleural shunts by the use of plastic tubing connecting the ventricles of hydrocephalic patients to these other cavities. This work has proved life-saving in several instances. Doctor Ransohoff is also studying the effects of implanted alumnia cream in various parts of the monkey brain with regard to behavior changes and psychomotor epilepsy.

Dr. Charles A. Carton, Chief Resident, has conducted virus studies on patients with trigeminal neuralgia which indicate activation of latent virus

after nerve root section. This work has opened up interesting concepts regarding virus infections. Dr. Carton is also applying laboratory studies of virus infection to the rabbit.

Dr. James B. Campbell is conducting an intensive study of stereotaxic methods for animal and man by the implantation of radioactive substances in brain tumors. This method is also to be applied to other types of illness such as the treatment of psychoses, pain, tremor, cerebral palsy, etc.

Professor J. Lawrence Pool in conjunction with Dr. James B. Campbell is investigating a new application of electrical stimulation for the control of paraplegic bladders in the laboratory.

Professor Pool with Dr. Melvin D. Yahr and Dr. Sidney Cohen of the Department of Neurology is conducting a laboratory study of the electrical identification of the trigeminal nerve which has already been applied to surgical procedures.

Distinguished visitors lectured in the Department during the academic year. Dr. A. C. de Vet of the Hague, Holland delivered two lectures on epilepsy and the surgical treatment of post-herpetic neuralgia and pain surgery. Professor Charles M. Pomerat of the University of Texas Medical Branch gave a talk illustrated with moving pictures of glial cells of the brain which showed their motility in tissue culture preparations. Dr. R. E. Hemphill of Bristol, England spoke on endocrine disturbances in psychiatric patients.

DEPARTMENT OF NEUROLOGY

Professor H. Houston Merritt, Executive Officer

The clinical and teaching activities of the Department of Neurology remained at their usual level in the past year. The elective course in neurology for the third year students was again quite popular, more than one-half of the class electing this course. The clinical facilities at the Neurological Institute of the Presbyterian Hospital and the laboratories of the Department at the Medical School have served as a training ground for clinical teachers and research workers from various universities in the United States and other countries.

Dr. Bertram E. Sprofkin has completed two years of study in our Department under a fellowship of the United States Public Health Service. On July 1, 1952, he returned to Nashville, Tennessee to take charge of the teaching of neurology at Vanderbilt University. Captain Robert Williams completed two years training and, after an additional year of training in psychiatry, will return to the United States Air Force in their neurologic and psychiatric division. Commander John E. Nardini was assigned by the

United States Navy to the Neurological Service in September, 1951, as a fellow, to receive training in clinical neurology and neuropathology. Other fellows who have spent six months or more in the Department include Dr. Alonso Higuero of Panama; Dr. John H. Vaughan, National Research Fellow; Dr. Frederick Boykin, Fellow in Neuropathology; Dr. Mario Altamirano, Visiting Fellow from Chile; Dr. Sidney M. Cohen; Dr. Stanley Aronson; and Dr. Karel van Syckel Toll of Baltimore.

A small research laboratory has been equipped on the ground floor of the Neurological Institute for the study of clinical electrophysiological problems. Rearrangement of these quarters and purchase of equipment were aided by a grant to the Hospital from the Association for the Aid of Crippled Children. In addition, the grant subsidized experimental work directed toward a solution of the physiologic basis of convulsive seizures. Also housed in these quarters are the laboratories of the nerve injury project. Under a grant from the Veterans Administration Professor Harry Grundfest, Dr. Melvin Yahr, and others are studying the effects of injuries to the nerves sustained by members of our armed forces in the Second World War and in the Korean conflict. Space was also assigned to the Department of Otolaryngology for a cooperative study of the vestibular reactions.

The resident staff of the clinical services has as usual been encouraged to participate in the clinical research. Among the papers read by members of the resident staff before the New York Academy of Medicine or the American Neurological Association were: "Involvment of the Nervous System in Sickle Cell Anemia,"by Dr. Lewis P. Rowland; "Involvement of the Nervous System in Sarcoidosis," by Dr. Robert Williams; "Korsakow's Psychosis in Patients with Tumors of the Brain," by Dr. Bertram Sprofkin; "Involvement of the Nervous System in Behcet's Disease," by Dr. Christian Herrmann; "Carcinomatosis of the Meninges," by Dr. Lillian Strange; and "Thrombosis of the Superior Longitudinal Sinus," by Dr. Robert Fishman. Other studies published during the year by members of the resident staff include: "A Study of Word Deafness"; and "An Analysis of the Phenomenon of Extinction in Patients with Organic Lesions of the Brain" by Dr. Dewey Ziegler.

Professors Sidney Carter and Danial Sciarra, and Drs. Frederick T. Zimmerman and Yahr have continued their investigations on the chemotherapy of convulsive seizures in adults with the aid of grants from the Benjamin Lazrus Foundation, Inc. A new compound for the prevention of petit mal attacks was tested by Dr. Zimmerman under a grant by Parke, Davis and Company.

The effects of long-term administration of corticotropin or cortisone on the symptoms and course of multiple sclerosis are being investigated by Dr. Gilbert H. Glaser with the aid of grants by the National Multiple Sclerosis Society and the United States Public Health Service. Dr. Glaser is also study-

ing the effects of the administration of corticotropic and cortisone on the excitability of the cerebral cortex, peripheral nerve, and muscle. The physiological concomitants of the seizure state are being studied by Professor Hoefer and Dr. Glaser by means of activation techniques in electroencephalography. Sleep, photic stimulation, and various drugs are being utilized in the production of generalized or focal seizure patterns. The problem of psychomotor epilepsy in relation to temporal lobe abnormalities in receiving primary consideration.

In the Electroencephalographic Laboratories, Professor Hoefer and Dr. Herrmann are studying the refractory period of muscle in normal subjects and in patients suffering from myopathies. Professor Hoefer, in conjunction with Professor J. Lawrence Pool of the Department of Neurological Surgery and Dr. Sidney Cohen, have undertaken an exploration by means of microelectrodes of the electrical activity of the various layers of the cortex in carnivores. Later electrical and chemical stimulation will be used together with thermocoagulation and various forms of ablation. As in former years numerous graduate students from abroad and from this country visited the Electroencephalographic Laboratory for periods varying from several weeks to one year. The Department was host to the Eastern Association of Electroencephalographers for the annual meeting in December. Professor Hoefer was invited to give a series of lectures in Denver, Colorado during the past summer.

Efforts to purify the antigen in the brain tissue which when combined with certain adjuvants and injected into Rhesus monkeys results in the appearance of acute disseminated encephalomyelitis are being continued by Professors Elvin A. Kabat and Abner Wolf, and Miss Ada E. Bezer.

In connection with his activities on the Subcommittee on Shock of the National Research Council, Professor Kabat and Miss Deborah Berg have shown that the polysaccharide dextran, which has been used as a plasma expander, is antigenic in man.

Dr. Sidney Leskowitz and Professor Kabat are continuing studies on the blood group substances. Dr. Beiser's dissertation on the bovine blood group substances has appeared in the *Journal of Immunology*. With Professor Kabat, Dr. Beiser and Miss Berg have completed a study of several types of so-called "natural" anti-A and believe that all anti-A is formed in response to environmental antigenic stimulation.

Dr. Beiser, Mr. Joseph M. Schor and Professor Kabat have completed a study of several preparations of the Type II pneumococcal polysaccharides. Dr. John H. Vaughan has been working in the laboratory with Professor Kabat as a National Research Council Fellow and has been studying the amounts and kinds of rabbit antibody necessary for passive transfer of skin sensitivity to human skin.

The estimation of gamma globulin in cerebrospinal fluid is being carried out by Miss Gloria Petrilli. Dr. Yahr and Professor Kabat are correlating the findings to ascertain the advantages and limitations of the method.

Professors Frederic A. Mettler and Grundfest have continued their studies on the physiology of the nervous system, particularly the relationshop of the basal ganglia to higher and lower centers, with the aid of grants from the United States Public Health Service, the Teagle Foundation, and the United Cerebral Palsy Association. Dr. Howard Krieger by electrophysiological methods has extended considerably our knowledge of the dorsal spino-olivary tract. Dr. Sidney Cohen has completed an extensive investigation of the electrical topography of the thalamus and has produced new data on the spinal pathways afferent to the nucleus.

Dr. John R. Whittier is making a graphic analysis of cinematographic records of abnormal movements and Dr. Malcolm B. Carpenter has continued the experimental production of animals displaying such movements. Dr. James B. Campbell of the Department of Neurological Surgery is further extending the studies of Drs. Whittier and Carpenter upon the methodology of space-controlled lesions, using radioactive compounds as the destructive agent. Mr. Stanley Crain and Professor Grundfest have continued their work with Professor Margaret R. Murray of the Department of Surgery, on action potentials from nerve cells in vitro, and Mr. Crain has completed a study of the development of cortical potentials in the neonatal rodent. Mr. Christian Hovde has completed an electrophysiologic study on striofugal conduction from the caudate nucleus and is currently engaged in a similar study on the putamen.

Professor Grundfest, in connection with Dr. Rita Guttman of the Department of Biology of Brooklyn College, Dr. Charles J. Hendley of the Department of Neuropsychiatry of Tulane University and Dr. Irwin B. Wilson, found that the giant axon spike can be modified in form and amplitude by lowering the external sodium concentration. Further work was carried out by Professor Grundfest, Professor David Nachmansohn, Dr. Wilson and Mr. Peter Pauling on the ionic concentrations in squid giant fibers at rest and during activity. Professor Grundfest has in progress with Drs. Mario Altamirano, Christopher W. Coates of the New York Zoological Society, and Professor Nachmansohn, studies on the electrical responses of the electric organ of the electric eel. This work has been aided by grants from the United States Public Health Service.

The division of neurochemistry in the Department under the direction of Professor Nachmansohn continued its studies on enzymes and intermediate chemical reactions of nerve tissue in relation to nerve function. The work is aided by grants from the United States Public Health Service, the Surgeon General of the Army, and the Atomic Energy Commission.

Professor Nachmansohn is the Editor of the *Transactions* of the Josiah Macy, Jr. Foundation conferences under the Chairmanship of Professor H. Houston Merritt. The *Transactions* of the first two conferences on the nerve impulse have been published; those of the third conference are in press.

The sub-division of the Department at the Montefiore Hospital under Professor Theodore J. C. von Storch has carried its usual share of the teaching program. The wealth of clinical material makes an assignment to this hospital a popular one with the students. Research activities of members of the Department at the Montefiore Hospital include clinical and physiological studies on the problems of migraine and other forms of chronically recurring headaches by Professors von Storch and Arnold P. Friedman, and pathological studies on neoplasms, malformations, and various organic diseases of the brain by Dr. Martin Netsky.

Professors Israel S. Wechsler and Joseph H. Globus at Mount Sinai Hospital retired at the close of this academic year. Dr. Tiffany Lawyer resigned to accept the position as Chief of Neurology in the Division of Neurology and Psychiatry of the Veterans Administration in Washington, D. C.

The list of distinguished visitors who gave lectures in the Department in the past year includes: Dr. F. M. R. Walshe, London; Dr. J. Z. Young, Oxford; Dr. Dennis Hill, London; and Dr. E. Graeme Robertson, Melbourne, Australia. Other distinguished visitors were Dr. Thomas M. Greenaway, Sidney, Australia; Dr. Manuel Velasco Suarez, Mexico City; Dr. F. Ramirez, Montevideo; Dr. Estoban D. Rocco, Lima, Peru; Dr. Georges Schaltenbrand, Wurzburg, Germany; Dr. F. H. Ritter, Porte Alegre, Brazil; Dr. S. P. Bharuche and Dr. N. D. Patel, Bombay, India; Dr. Paulino W. Long, Sao Paulo, Brazil; Dr. David Fairman, Buenos Aires, Argentina; and Dr. A. Austregilsilo of Rio de Janeiro, Brazil.

Professor Henry A. Riley and H. Houston Merritt attended the meeting of the Planning Committee of the Fifth International Neurological Congress in Lisbon in July, 1951. Dr. Lothar Kalinowsky attended the International Congress on Psychotherapy in Leiden, Holland and the German Congress for Neurology and Psychiatry, in Stuttgart in September. Dr. Maximilian Silbermann was a delegate of the American Neurological Association to the Second International Poliomyelitis Congress in Copenhagen in August. Professor Merritt was elected President of the Association for Research in Nervous and Mental Disease for 1952 and Secretary of the American Neurological Association for 1952–1953. He is also Chairman of the Committee on Neurology of the National Research Council and a member of the Council of the National Neurological Diseases and Blindness Institute and the Mental Health Institute of the United States Public Health Service.

Approximately seventy articles and four books were published by members of the Department of Neurology during the past year.

DEPARTMENT OF NURSING

Professor ELEANOR LEE, Acting Executive Officer

A recent survey showed that 130 colleges or universities are represented in the present nursing school enrollment.

Comparative figures on enrollment in the degree program indicate an increase in the number of students with a two-year college background; 71 per cent of the students now enrolled and 80 per cent of the candidates for September, 1952, have completed two years or more of college preparation. Since the establishment of the Department of Nursing of the Faculty of Medicine, 1,088 nurses have been graduated of whom 50 per cent have received the degree of Bachelor of Science from Columbia University, as well as the diploma in nursing from the Presbyterian Hospital.

The Dean Sage Memorial Scholarship was awarded to Miss Florence A. Drake. This is the sixth award of the scholarship, which provides tuition and University fees for a degree candidate. One scholarship of $200 from the Florists' Telegraph Delivery Association, Inc., Units A & B, Region 2, has been made available again this year, upon the recommendation of Mr. John Cardasis, Medical Center Florist Shop, to Miss Sylvia Marcucci.

Eleven Alumnae Association Scholarships of $50 each were awarded in May to six students in the Class of 1953. One of these scholarships, The Class of 1936 Scholarship, was awarded to Miss Lotte Stern. The 1920 Memorial Scholarship of $50 was given to two students, Miss Jennie Elms and Miss Mary Newton. A total of $1,625 was granted for University Stipends to eleven students in the Class of 1953 and five students in the Class of 1954. Two Richard Walsh Scholarships were awarded in September to Miss Mary Flood and Miss Mildred Netchke. The Patricia Green Smith Scholarship was awarded in September to Miss Patricia DuBois.

A new scholarship fund in memory of Jane Craig McAllister, daughter of Dr. and Mrs. Ferdinand McAllister, was established in February, 1952, by nurses, doctors and other friends of the McAllister family.

On June 4, 1952 the Margaret E. Conrad Scholarship Fund in Nursing was established in honor of the first professor and executive officer of the Department by gifts totaling $2,000.

Mrs. Harriet Mantel Deleuran, Instructor, was promoted to Assistant Professor on July 1, 1951 to replace Miss Dorothy Rogers who retired on June 30, 1951.

Miss Ruth A. Lynch, Instructor, was transferred to the position formerly held by Mrs. Deleuran. Miss Lynch has special preparation and qualifications for counselling and has been correlating the guidance program in which all of the faculty members participate.

The appointment of three instructors with experience elsewhere, to assist

Professor Helen F. Pettit has strengthened the educational program. Miss Dorothy E. Reilly was appointed to replace Miss Lynch. Miss Reilly has had experience at Boston University School of Nursing with a special project on integration of basic sciences with nursing. Miss Josephine C. Brown was appointed to replace Miss Grace E. Davidson, on military leave with the Army Nurse Corps. Miss Virginia J. Haggett was appointed to replace Miss Ruth I. Fisher.

We record with sorrow the death of Miss Phyllis L. Partridge, Instructor, on January 17, 1952. Miss Lucille D. Manning was promoted to fill this position. Miss Marjorie H. Stewart and Miss Ellen G. Smith were appointed Instructors. Miss Rose M. Hoynak was appointed Instructor to replace Miss Virginia A. Gill, on military leave with the United States Air Force.

Other new Instructors include Miss Frances H. Barrows, Mrs. Josephine E. Mellor, and Miss Alice L. Rodenhiser, graduate of the Children's Hospital School of Nursing in Boston, who was appointed on the pediatric service to replace Miss Gladys McGregor who had received a scholarship at Teachers College for the Master's degree program in pediatric nursing.

Still others include Miss Yvonne A. Treibilcock on the Urological Service, Miss May McMillan, assigned to nutrition and diet therapy, replacing Miss Margaret F. Frank, who resigned January, 1952 to accept a research fellowship at Teachers College.

Considerable improvement in the curriculum this year has been the result of active participation by the entire staff. A new summary of instruction, totaling 1,005 hours, including 510 hours of clinical instruction, has been prepared. Due to the regrouping of courses and increase in clinical instruction, the sixty-two credits (fifty-two credits plus ten for clinical experience) designated by the University in 1937 for the nursing program, has been adjusted to meet these changes.

To continue the plan of relating all content as closely as possible and to equalize the material presented in each semester of the first year, the course in microbiology was divided into two parts with thirty hours transferred to the Spring Session for further integration of the basic sciences with medical and surgical nursing.

The integration of the social sciences throughout the whole teaching program has been studied. The concept has been broadened this year in the area of mental health by including fifteen hours of instruction given by Dr. Paul D. Ecker, in the first semester of the first year. In the Spring Session, a continuation of mental health content was given by Dr. Ecker, concurrently with the teaching of medical and surgical nursing. In the junior classes last Fall a combined course on modern social problems was developed by rearranging the content previously included in three fifteen-hour courses, history of nursing, professional adjustments, and social service conferences.

The Class of 1953, 104 students, divided into groups of eight students, started in October, 1951, the new clinical rotation plan for second year assignments. On June 3, 1952 the first eight students of the Class of 1953, Group A, were assigned for twelve weeks to psychiatric nursing instruction and experience at the New York State Psychiatric Institute and Hospital. The Class of 1953 is the first class in the history of the School in which each student will have twelve weeks of clinical experience in psychiatric nursing (instruction and practice) at the New York State Psychiatric Institute and Hospital. In addition, nursing in otolaryngology and ophthalmology, previously elective services, were changed this year to a four weeks' assignment with clinical instruction.

The Out-Patient Nursing Service has become highly valuable under the able direction of Miss Constance Hamon. The number of students assigned to this service was fifty-six. The number of home visits made was 3,304. Also included were field trips to welfare agencies, observations in the Child Health Service at the Washington Heights Health Center and presentation of family studies at weekly conferences. In addition, sixty-three all-day observations with the Visiting Nurse Service of New York were scheduled during the three class blocks. The students gained a great deal of insight from observing the patient in his home and as a member of the community.

Senior electives for the Class of 1952 were: eight students at the Mary Imogene Bassett Hospital in Cooperstown for eight weeks; eight students in the degree program for eight weeks in two groups at the Visiting Nurse Service of New York.

During this year 704 students from 22 affiliating schools of nursing have completed the program of instruction and experience in neurologic, obstetric, orthopedic, outpatient, and pediatric nursing. Arrangements for the twelve weeks' affiliation in pediatric nursing beginning in January, 1953, have been completed with two schools of nursing, the Orange Memorial Hospital and the Newark Presbyterian Hospital.

The first Anna C. Maxwell Fellowship has been awarded for graduate study at Teachers College, Columbia University for the academic year 1952–1953 to Miss Frances S. Beck, graduate of Guy's Hospital School of Nursing in London.

Mrs. Cecil Woodham-Smith, English authoress of the biography, *Florence Nightingale,* spoke at Maxwell Hall on October 30, 1951 to an audience of senior students and guests. She presented autographed copies of her biography and *Lovely Crusader* to the Florence Nightingale Collection.

On January 3, 1952, Miss Anna Neagle, first lady of the British screen, presented a replica of the famous lamp used by Florence Nightingale during the Crimean War to the Nightingaliana Collection. The lamp was used by Miss Neagle in her new picture, *The Lady with a Lamp.* Miss Patricia

Nutter, President of the Class of 1953, accepted the gift following the presentation.

Other international guests included: Miss Paula Hegarty from St. Thomas' Hospital in London, on a Florence Nightingale Foundation fellowship for a year's study in America; Miss Dorothy Pringle from Leeds Maternity Hospital for a six months' visit on a scholarship from Leeds Regional Board of the United Leeds Hospital; and Miss Rebecca Lipschitz of the Hadassah Hospital in Jerusalem who came in February for six months' experience in orthopedic nursing.

The annual conference of Directors of Schools of Nursing was held in Chancellors Hall, Education Building, Albany, New York. Professors Eleanor Lee, Harriet M. Deleuran and Jesse J. A. Mutch attended.

Three members of the Faculty of the Department of Nursing assisted with the program of the National Nursing Accrediting Service. Professor Mutch was appointed a member of the National Board for Temporary Accreditation for non-collegiate schools of nursing. Professor Deleuran and Professor Pettit assisted with the temporary accreditation program and each visited ten schools of nursing. Professor Covell is a member of the Joint Committee on Inspection of Accrediting Activities of the National Nursing Accrediting Service and Chairman of the Accrediting Committee of the National Association of Practical Nurses Education. Professor Mutch was Chairman of the sub-committee on course assignment for teaching nurses in preparation for civil defense and taught courses to professional and practical nurses in "Nursing in Atomic Diaster."

The Faculty of the Department of Nursing is well represented on the committees preparing the Achievement Tests for the National League of Nursing Education. Members from our staff included Professor Marjorie Peto, Miss Elizabeth S. Gill, Miss Constance Hamon and Miss Dorothy E. Reilly.

Miss Elizabeth S. Gill is assisting Dr. Charles Solomon with the new edition of his book, *Pharmacology, Materia Medica and Therapeutics.* Miss Gill is also reading manuscript of Dooley and Rappaport, *Pharmacology and Therapeutics in Nursing,* for the McGraw-Hill Publishing Company.

Miss Peto and Miss Louisa Kent attended the meeting of representatives of schools affiliated with Hartwick College School of Nursing held at the College on November 16, 1951. The New York Academy of Medicine Eastern States Health Education Conference held on April 24 and 25, 1952 was attended by three University delegates, Miss Constance Hamon and two senior students, Miss Laurie A. Lowe and Miss Sally Ann Smith.

The biennial convention of the five national nursing organizations was held June 16–20, 1952 in Atlantic City. Miss Gill represented the Faculty of the Department of Nursing. Miss Patricia Nutter, President of the Student Government Association, Miss Ruthanne Farrell, President of the Class of

1953, Miss Margaret DeChant, Secretary-Treasurer of the Student Government Association, and Miss Anne Becker, President of the Class of 1954, attended as student representatives.

Professor Pettit received her Masters Degree from the School of Education of New York University in June, 1952. Professor Dephine Wilde was the author of the article, "The Patient in a Spica Abed and Afoot," published in the *American Journal of Nursing* in July, 1951. Professor Marion E. Cleveland is a member of the Conference Committee for the Improvement of Nursing Care for the People of New York State and the Committee to Study Isolation Technique for the Poliomyelitis Patient. Mrs. Helen C. Delabarre is Chairman of the National League of Nursing Education's Committee on References and Visual Aides in Neurological Nursing and is continuing with the preparation of a textbook on neurologic nursing.

At the meeting of the Student Nurse Association of New York State in October, 1951, the constitution was ratified and signed by fifty-two schools of nursing. Miss Ruth Klawunn, President of the Class of 1952, and Miss Betty J. Foster, President of the Student Government Association, were delegates. Miss Klawunn was elected to the Board of Directors of the Student Nurses Association of New York State. Miss Marie T. Malloy was elected President of the Student Nurses Association of District 13.

At the annual meeting of the Board of Review of the National Nursing Accrediting Service the diploma and degree programs in nursing offered by the Department of Nursing were approved for accreditation during 1952.

The Department of Nursing was accepted for Associate Membership in the Association of Collegiate Schools of Nursing at the January, 1952, meeting of the Board of Directors of the Association. This membership will mean a great deal to the School and the Faculty as the School will become an agency member in the new National League for Nursing.

Ninety-one graduates of the School took the New York State Board Test Pool Examinations. Fifty-six per cent of these candidates received an average on the six examinations of ninety to ninety-eight per cent.

During the academic year we received 222 applications for admission. One hundred and eighteen candidates were accepted for the September, 1952 Class of whom ninety-two were degree candidates and twenty six were diploma candidates.

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Professor Howard C. Taylor, Jr., Executive Officer

The past year in the Department of Obstetrics and Gynecology has been eventful for many reasons. The Department finally moved into the laboratories assigned to it. The labor and delivery rooms in the Presbyterian Hos-

pital, which had been unavailable for some time during reconstruction, were reopened. There has been increased activity on the gynecologic service at the Francis Delafield Hospital.

The laboratories of the Department of Obstetrics and Gynecology are now conveniently located in the Medical School building, immediately adjacent to the administrative offices of the Department and to the clinical wards in the Hospital itself. In addition, in the Institute of Cancer Research there is now a gynecologic unit on the fifteenth floor, working largely on the relationship of steroid hormones to cancer, under the immediate supervision of Professors Seymour Lieberman and Gray H. Twombly. Several small laboratory rooms are also available in the Delafield Hospital for cancer studies conducted in association with the laboratories of Professors Lieberman and Twombly in the Institute of Cancer Research.

The work of the gynecological division in the Delafield Hospital has increased rapidly in the last few months, so that there are now an average of about thirty cases of gynecologic cancer under continuous treatment. The plan has been followed of integrating closely the work of this part of the division of obstetrics and gynecology with that in the Presbyterian Hospital, so that the same group of clinicians and teachers supervise the gynecologic work in each institution and an identical plan of cancer therapy prevails. It is believed that this plan will provide clinical material for the training of specialists in gynecology and obstetrics unparalleled in this respect elsewhere in the country.

Note should also be made of the opening of the newly reconstructed delivery and labor room suite on the seventeenth floor of the Presbyterian Hospital. This provides greatly increased facilities for the care and study of patients in labor and for the instruction of students.

Changes in personnel in the staff of the Department during the past year include the appointment of Dr. Landrum B. Shettles as Associate, Dr. Arnold N. Fenton as Assistant and Dr. Robert Richter as Research Assistant. Doctor John Connell, Attending Obstetrician at the Margaret Hague Hospital, has been appointed Assistant Clinical Professor of Obstetrics and Gynecology to succeed the late Dr. James F. Norton. Among promotions are to be noted that Dr. C. Paul O'Connell and Dr. Harold Speert, both from the rank of Instructor to that of Associate.

Dr. Joseph Jailer, formerly Research Associate in Medicine, assigned to Obstetrics and Gynecology, has been promoted to the rank of Assistant Professor of Medicine and continues his assignment with this Department. Dr. Seymour Lieberman will receive his promotion as Associate Professor of Biochemistry, assigned to the Department of Obstetrics and Gynecology, on July 1, 1952.

Doctor Royal C. Van Etten, after many years of service to the institution,

retired as Clinical Professor of Obstetrics and Gynecology. Among the younger men may be noted the resignation of Dr. William E. Pollard and Dr. James M. Greer, both of whom have settled in neighboring suburban communities and no longer have the time to give for teaching activities in the Medical School. Dr. Eugene S. Coler is on leave of absence serving with the Strategic Air Command.

There are at present five men working on fellowships in this Department. Dr. Georges C. Duperroy of the University of Louvain holds a fellowship from the Belgian-American Educational Foundation, and was recommended by the Faculty for the degree of Doctor of Medical Science. Two visiting fellows from South America are Dr. Benjamin de Almeida Passos of Rio de Janeiro, Brazil, and Dr. Hector Enrique Bernal of Bogota, Colombia, both holding fellowships from the Federal Security Agency under the terms of the Convention for the Promotion of Inter-American Cultural Relations. Dr. Joseph W. Jailer is a senior Damon Runyon clinical research fellow and Dr. Landrum B. Shettles, at present studying the methods of clinical and laboratory research in gynecology and obstetrics in Europe, is a John and Mary R. Markle Foundation Scholar in the medical sciences.

The Department has had four guest lecturers: Dr. Arthur T. Hertig, pathologist to the Boston Lying-In and Free Hospitals for Women; Dr. Louis M. Hellman, Professor of Obstetrics and Gynecology at the State University of New York, College of Medicine in New York City; Dr. Claude E. Heaton, Associate Professor of Obstetrics and Gynecology at New York University; and Dr. Somers H. Sturgis, Assistant Surgeon, Massachusetts General Hospital.

With regard to the problem of sterility a relatively new and important principle has been introduced by the research of Professor C. Lee Buxton on the bacteriology of the cervix in relation to certain cases of sterility. A considerable expansion of this work is now in progress as the result of a special grant from the United States Public Health Service. In relation to functional disorders of the reproductive organs, note should also be made of the work of Professor Jailer in cases of adrenal virilism.

With regard to the physiology of the ovary Professor Earl T. Engle has been working with Dr. Margaret E. Long on the cytochemistry of the normal human ovary, with special regard to the aging ovary and to steroid production. Professor Engle during the past year has also published chapters on endocrine subjects in five different texts or journals.

The subject of the physiology of pregnancy remains an important one in this Department. Doctor Byron C. Butler has published a paper entitled "A study of Serum Trypsin Inhibitor in Pregnancy" and is continuing his work on the relationship of fibrinolysin systems to pregnancy. Professor Lieberman is studying in great detail the excretion rate of corticoids in pregnant patients, preparatory to the investigation of the same subject in patients with toxemia

of pregnancy. Dr. Albert Plentl has established laboratories for the study of the distribution of water and electrolytes in the body during normal pregnancy and delivery, during episodes of toxemia of pregnancy and in response to treatment of these cases with certain resins. The work of Dr. Plentl is also being supported by a grant from the United States Public Health Service.

Professor Charles M. Steer has continued to work on the analysis of some 600 records of hysterographic recordings of the electrical currents of the contracting uterus during labor. Mention must also be made of the important cooperation now possible with the Department of Anesthesiology on account of the assignment of Professor Virginia Apgar to obstetrical anesthesia.

In cooperation with the Department of Pediatrics, studies have progressed in the physiology of the fetus and of the newborn. Professor Steer with Mr. George Hertsch has published a paper on "The Continuous Observation of the Fetal Heart." A paper also has been published on 'The Causes of Fetal Mortality at the Sloane Hospital" by Professor Steer and Dr. Walter P. Kosar.

The program of research in gynecologic cancer has been particularly active as a result of a number of grants, with funds coming from the American Cancer Society, the Damon Runyon Memorial Fund, the Isabel MacMillin Memorial Fund, and other sources.

The morphology of the degrees of differentiation of malignant tumors is undergoing preliminary study by cytochemical methods as the direct work of Dr. Long, but a considerable expansion of this program is now planned, with a correlation of chemical and cytochemical observations and the more traditional form of hystologic grading. Dr. Jerome Harris has published a review article on the same subject entitled "Histological Grading of Squamous Cell Cancer of the Cervix." Dr. Saul B. Gusberg, with Dr. Harold Tovell, has been studying the problem of radiation sensitivity, by means of a series of biopsies obtained during the course of radiation therapy and stained by methods designed to demonstrate nucleoproteins.

The general program of study of steroid metabolism is developing well under Professor Lieberman. Also in the steroid field has been the work of Professor Twombly, who has been utilizing radioactively tagged steroids to determine the routes of excretion and possible areas of concentration of steroid hormones in the body.

Beside the research studies mentioned, there have been a large number of investigations of clinical problems. Doctor Byron C. Butler has been studying the relative morbidity of patients treated by hysterectomy when the operation is done with the use of silk sutures on the one hand and chromic sutures on the other. Doctor Arnold N. Fenton has reported the results of the treatment of patients with prolapse of the umbilical cord, with sarcoma of the uterus, and with pregnancy associated with congenital abnormalities of the reproductive tract. Professor D. Anthony D'Esopo has devoted particular attention in the last year to the study of principles of correction of urinary incontinence

and has established a small special clinic for the investigation of cases with this complaint.

The outside activities of members of the Department have been numerous and include lectures delivered in various hospitals, meetings or medical schools by Professor Joseph W. Jailer, Dr. Jerome Harris, Professor C. Lee Buxton, Professor Howard C. Taylor, Jr., Saul B. Gusberg, Stanley M. Bysshe, and Earl T. Engle. Professor Buxton has been elected Chairman of the Obstetrical Section of the New York Academy of Medicine and Assistant Secretary of the New York Obstetrical Society. Professor Engle is President-Elect of the Endocrine Society. Professor Taylor has continued to serve as a Director of the American Cancer Society and of the American Committee on Maternal Welfare.

In conclusion, appreciation is expressed to the University for the assignment of laboratory space and facilities which should make possible a productive development of the intellectual aspects of the Department. There remains the problem of the development of a small full-time staff of clinically trained investigators in obstetrics and gynecology. It is believed that considerable progress has been made in increasing the productivity of this Department with the aid of a number of devoted part-time staff members and that a small full-time staff in addition, can, eventually, be developed.

DEPARTMENT OF OPHTHALMOLOGY

Professor John H. Dunnington, Executive Officer

During the past year the undergraduate and the pre-residency teaching programs have been participated in by all of the members of the Department. In addition to these formal courses of instruction, particular attention has been devoted to the teaching of our residents. Informative lectures were presented by three guest speakers: Mr. T. Keith Lyle of Moorfields Hospital in London, who addressed us on "Diplopia as a Diagnostic Symptom"; Professor Franz von Brucke, Director of the Pharmacological Institute of the University of Vienna, on "Differences Between Central and Reflex Stimulation of the Sympathetic Nervous System"; Dr. Krishna Mathur, Medical College, Agra, India, on "Epidemic Dropsy Glaucoma." Of the ten visiting scholars with us during this period, eight came from foreign countries. There have been no resignations during the past year but two new Assistants were appointed. They are Drs. Robert McC. Day and Philip Knapp.

In the Knapp Memorial Laboratory of Physiological Optics Professor Ludwig von Sallmann in collaboration with Professor Zacharias Dische has investigated for the Atomic Energy Commission the problem of radiation cataract from the clinical, morphological cytological, cytochemical and biochemical aspects. Professor von Sallmann in cooperation with Drs. Marina

Meyers and Burkhart Pillat studied the effect of noradrenalin and adrenalin on the eyes of cats. Professor von Sallmann and Dr. Pillat also investigated the sensitization of these eyes to adrenergic stimuli by cortisone and ACTH by measuring the intraocular pressure and the systemic blood pressure by means of electro-manometric devices.

Professors von Sallmann and Dische working under the auspices of the Surgeon General of the United States Army are studying the problem of absorption of blood from the vitreous in the hope of establishing a rational basis for the treatment of vitreous hemorrhages.

Under the direction of Professor von Sallmann, Dr. R. Lawrence Wiggins, a fellow of the Knapp Foundation, has extensively studied the effect of Polymyxin B on many strains of *Bacillus pyocyaneus* and demonstrated both in vivo and in vitro the effectiveness of this substance on ocular infections produced by this organism. This work has been accepted as his thesis in partial fulfillment of the requirements for the degree of Doctor of Medical Science by Columbia University.

Among other investigations carried on under the supervision of Professor von Sallman was Dr. John Locke's work on 'Antagonism and Synergism in Antibiotics." In view of the reported antagonism between pencillin and choloromycetin he studied the combined action of these antibiotics in vitro and in intraocular staphylococcal infections in rabbits. The results were reported before the Association for Research in Ophthalmology at its meeting in Chicago in June and formed the basis for his thesis for the degree of Doctor of Medical Science which was conferred on him by Columbia University in June.

The influence of cortisone on the healing of epithelial wounds in rats, on the healing of trephine wounds in the sclera of monkeys, the absorption of red blood cells in the vitreous in rats and on cortisone's influence on the permeability of the blood aqueous barrier to fluorescein in rabbits were studied by Professor von Sallmann in collaboration with Drs. Wiggins and Jones. Dr. Paul Sullivan with the aid of Professor von Sallmann investigated the effect of cortisone on capillary permeability in the anterior segment of the eye using fluorescein and serum proteins. In collaboration with Dr. Knapp, the treatment of experimental tuberculosis with rimifon is being investigated by Professor von Sallmann.

Professor George K. Smelser has returned from a leave of absence granted to allow him to serve as biologist on the staff of the London Office of Naval Research. During this time the results of his studies on the changes in the optical properties of the cornea associated with contact lens wear have been published in the *Archives of Ophthalmology*.

Professor Dische has been concerned chiefly with the biochemistry of the lens under normal and pathological conditions. He is also studying the composition and metabolism of the lens capsule with particular attention being given to the polysaccharide of this membrane.

Professor Seymour P. Halbert has made an extensive study of the bacteria of the ocular flora and of their ability to produce antibiotic substances. He has shown that the antibiotic-producing bacteria common in the ocular flora largely belong to the genus *Micrococcus (Staphylococcus)*. He is also investigating streptolysin "O" in relation to conjunctival damage and making a detailed study of the biological properties of the toxin produced by beta hemolytic streptococci.

In the Knapp Laboratory of Physiological Optics Professor LeGrand H. Hardy, Dr. Gertrude Rand Ferree and Miss M. Catherine Rittler have continued their investigations on the quantitative measurement of defective color vision in an evaluation of the Hardy-Rand-Rittler plates with a battery of other color tests. Further experiments have been devised in the study of the metric of binocular space perception in order to ascertain the invariant factors in visual space for an individual. Doctor Charles J. Campbell has completed an investigation of size constancy in clueless vision as his thesis in partial fulfillment of the requirements for the degree of Doctor of Medical Science.

Dr. Otto Lowenstein, working under grants-in-aid from the Mary W. Harriman Glaucoma Fund and the Snyder Ophthalmic Foundation, has studied the effect of fatigue on pupillary movements. He has also shown that characteristic pupillary changes occur in several diseases, e.g., multiple sclerosis and glaucoma, prior to clinical manifestations. The effect of physostigmine and pilocarpine on the iris sphincter of normal man and the mechanisms of pupillary dilatation are being studied. In collaboration with Dr. Sean Murphy the pathway of the pupillary reflex to light in cats is under investigation.

Among the other investigations which are being conducted by members of the Department are: Professor John H. Dunnington with the assistance of Dr. Ellen F. Regan on "Ocular Wound Healing"; Professor Algernon B. Reese and his co-workers, Drs. Frederick C. Blodi and John C. Locke, on "The Etiology and Treatment of Retrolental Fibroplasia"; Professor Willis S. Knighton with the aid of Dr. Andrew de Roetth, Jr. on "Evaluation of the Aqueous Outflow Test in Glaucoma"; Dr. Graham Clark on 'The Treatment of Detachment of the Retina"; and Dr. Robert McC. Day in collaboration with Professor Sidney C. Werner of the Department of Medicine on "The Ocular Findings in Thyroid Disease."

Most of the research activities have been financed through grants-in-aid from several foundations, among which are The Marie Heye Clemens Fund, Inc., The Mary W. Harriman Glaucoma Fund, The Dunlevy Milbank Foundation, The Sloan Glaucoma Fund, The Snyder Ophthalmic Foundation and The Whitehall Foundation, Inc. To them, as well as to all other benefactors, grateful appreciation is expressed for their continued generosity.

The members of the Department have held important positions of trust in national and local ophthalmological organizations and received honors in

recognition of services rendered. Professor von Sallmann was awarded the Proctor Medal by the Association for Research in Ophthalmology, Dr. Gertrude Rand Ferree was made an honorary member in the American Academy of Ophthalmology and Otolaryngology, Professor Dunnington delivered The Jackson Memorial Lecture before the Academy of Ophthalmology and Otolaryngology, and Professor Algernon B. Reese was the guest speaker before the Mid South Postgraduate Assembly. Professor von Sallmann addressed the National Research Council Division of Medical Science for the United States Atomic Energy Commission and Professor Gordon M. Bruce was elected a member of the American Board of Ophthalmology. In addition to the twenty-six articles published by the members of the Department, Professor Reese's book on *Tumors of the Eye* has appeared. In the enthusiastic reception which has greeted this excellently written and beautifully illustrated volume the Department takes just pride.

DEPARTMENT OF ORTHOPEDIC SURGERY

Professor Alan DeForest Smith, Executive Officer

One of the most important developments in the Department of Orthopedic Surgery during the past year was the expansion of its laboratory service for both routine investigations and research. The laboratory of Professor C. Zent Garber in the Department of Pathology was finally equipped and put in full operation late in the year. It includes facilities for tissue examinations, care of small animals, and chemical research. Space is provided for the residents and fellows to study and to do research.

The histochemistry laboratory, which was started by Professor Stephen S. Hudack, has been enlarged. It became necessary to effect a reorganization of the laboratory as a result of Professor Hudack's resignation. A plan has been worked out by which Professor Raffaele Lattes of the Department of Surgery has consented to direct the activities of the laboratory. Dr. Gabriel C. Godman has been appointed as Associate to take direct charge of the work. Dr. James Blunt, Jr., during his surgical residency, has continued to investigate the nature of the ground substance in connective tissue and in bone repair and the effect of cortisone on wound and fracture healing. Under the direction of Professor Charles A. Ragan, Jr. of the Department of Medicine and with assistance from the American Rheumatism Foundation, other studies have been made on the effect of cortisone on connective tissue.

The funds for purchasing the necessary equipment and meeting some of the salaries have been provided from the research fund of the New York Orthopaedic Hospital. The Office of Naval Research has continued its loan of the apparatus which it provided for use in Professor Hudack's laboratory. Although the laboratory is set up under the Department of Orthopedic Surgery

and is being supported largely by it, it is intended to make its facilities available, in so far as possible, to other departments of the Medical School who wish to carry out projects involving the techniques of histochemistry. An Advisory Committee for the Histochemistry Laboratory has been appointed, consisting of Professors Karl Meyer, Arthur P. Stout, Edith H. Sproul, Charles A. Ragan, Jr., Raffaele Lattes, and Alan DeF. Smith.

The resignation of Dr. Hudack as Associate Professor of Orthopedic Surgery, to take effect on June 30, 1953, is regretted. Drs. Alexander Garcia and Keith McElroy were appointed Instructors in Orthopedic Surgery. Dr. Sawnie Gaston was promoted to Assistant Professor of Clinical Orthopedic Surgery.

Among the investigations by the members of the Department which were completed or in progress during the year were the following: an evaluation of the results of operative treatment of slipped upper femoral epiphysis, by Professors Halford Hallock and Harrison McLaughlin and Drs. George B. Ambrose and William R. MacAusland; an evaluation of results of treatment of congenital dislocation of the hip, by Dr. A. S. Atwood; a study of congenital and acquired coxa vara, by Drs. Alexander Garcia and Thomas Brown; an analysis of humeral heads resected because of fracture-dislocation, by Dr. Charles S. Neer II; the results of subtalar arthrodesis for fractures of the os calcis, by Drs. Frederick S. Craig and J. Ian Jeffrey; a study of tumors occurring in the hand, by Dr. Robert E. Carroll; continuation of observation on the significance of hemorrhage in the production of several types of bone lesions and a study of the physical and chemical properties of bone, by Professor Garber; the influence of hyaluronidase in bone repair in rabbits, by Professor Garber and Drs. John J. Gartland, Jr. and MacAusland; a study of the pathological findings in medial epicondylitis of the elbow, by Professor Frederick M. Smith and Dr. Garcia; a study of the stimulation of bone production by the use of constituents of callous suspended in gelatin, by Professor Harrison McLaughlin and Drs. Blunt and Garcia; a follow-up study of 112 cases of fractures of the shaft of the femur treated by internal fixation, by Dr. Garcia; the clinical uses of hyaluronidase in orthopedic surgery and of the use of hyaluronidase in joint hemorrhages in hemophiliacs, by Drs. Gartland and MacAusland; development of a prosthesis to replace the humeral head, by Dr. Neer; a study of central dislocation of the hip, by Dr. Neer; a study of the factors producing pain after Colles fractures, by Dr. Neer; measurement of anteversion of the femur, by Dr. Charles T. Ryder; studies of fractures of the supracondylar and lateral condylar regions of the humerus in children, by Professor Frederick M. Smith; a study of the results of treatment of fractures of the shaft of the humerus by internal fixation, fractures of the neck of the femur following radiation, and fractures of the olecranon process of the ulna also by Professor Smith; an analysis of the results of treatment of osteoarthritis of the hip by arthrodesis, various types of arthroplasty, and cordotomy by Professor Frank E. Stinchfield.

DEPARTMENT OF OTOLARYNGOLOGY

Professor Edmund P. Fowler, Jr., Executive Officer

Certain minor changes have been made in the otolaryngology teaching program for the year 1951–1952. The third-year schedule has been rearranged so that the student does not have to absorb the whole subject in ten concentrated days. The new system permits the medical student to see some of his patients in follow-up and also gives him time for book work in otolaryngology. There has also been an occasional lecture involving otolaryngology in the courses on psychosomatic medicine, anatomy, physical diagnosis and, when the occasion has warranted, in the Combined Clinic. In addition, each third-year student now has one morning on the wards to study the psychosomatic diseases of the ear, nose and throat. It is felt that the average medical student still receives inadequate training in E.N.T., especially if he is planning to practice general medicine or pediatrics.

The Department this year has been graced by the presence of Professor Anderson C. Hilding of the University of Minnesota, who has spent his entire sabbatical year in basic research. During this period he has been actively engaged in the following problems, under grants from the United States Army Air Force, the Hayden Fund and the Research Council of the American Otological Society: thresholds of angular acceleration; relation of vestibular vertigo to imbalance of the extraocular muscles and errors of refraction; action of vestibular stimulation on ocular accommodation and convergence; comparative histology of the different parts of the respiratory epithelium; review of the bony and membranous anatomy of the final turn of the chochlea; methods for lighting thick anatomic preparations for microscopic study; and a method for removal and dissection of the otic labyrinth; a new theory of hearing based on findings from the above research and an anatomic explanation for the deafness from acoustic trauma and for tinnitus; influence of respiratory epithelium on bone growth within the sinuses; influence of the aqueous humor on the growth of respiratory epithelium and conjunctival squamous epithelium.

Dr. Jules G. Waltner has been made Assistant Professor and has continued in his direction of the course for the third-year class and in his studies on the origin of the endolymph and perilymph.

Professor Franz Altmann has been promoted to Associate Professor and has continued his study in the changes in the cochlea and the brain stem after cutting the eighth nerve in cats. He has also continued his monumental work on congenital deformities of the human ear and has been working with experimentally produced anomalies in rats.

Dr. Henri Moulonguet, Visiting Scholar and Fellow in Otolaryngology from France, has been assisting Professor Hilding in his studies on vestibular thresholds. In addition, Dr. Moulonguet has been studying hearing tests with

Mr. Donald M. Markle in the Audiology Clinic. A paper on unilateral deafness and the vagaries of the Weber test was presented to the American Otological Society by the latter.

Dr. Alfred J. Magee from the Department of Ophthalmology, with the assistance of Professor Harry Grundfest of the Department of Neurology and Dr. Vladimir Epanchin, has been studying the action potentials of the eye muscles from vestibular stimulation as a part of the work on vestibular thresholds.

Professors Daniel C. Baker, George R. Brighton, and De Graaf Woodman, with the cooperation of the Department of Radiology, have been studying stereoscopic fluoroscopy in the new Endoscopic Suite in the Presbyterian Hospital. Under their direction various improvements in the technique for the localization and removal of foreign bodies have been carried out.

Professor Edmund P. Fowler, Jr., with the assistance of Professor Adolph Zeckel of the Department of Psychiatry, has continued studies of the psychosomatics of otolaryngology, with particular reference to allergic disease, Meniere's disease, and otosclerosis. In addition to the capillary circulation and personality types, the body types of affected individuals are being studied, through the cooperation of Professor William B. Sheldon of the Department of Medicine. Professor Fowler has continued in his work on the sensitivities of various organisms to various antibiotics with the cooperation of Miss Balbina A. Johnson of the Department of Surgery and grants from the Doho Chemical Corporation, Pfizer Company, and Winthrop-Stearns. Professor Fowler has also been investigating tissue sensitivity to infection under the Philip Hanson Hiss, Jr., Memorial Fund. With the assistance of Professor Elvin A. Kabat of the Department of Bacteriology, he is carrying on researches on the effect of denervation, particularly sympathetic denervation, on immune reactions.

A recent resident, Dr. Irwin A. Ginsberg, has gone to Guy's Hospital in London, while Dr. John Trethowan has come to Presbyterian Hospital in exchange, under the auspices of the Josiah Macy, Jr., Foundation. Doctor Trethowan, in addition to his regular work as an assistant resident, has been studying various techniques used in the treatment of Meniere's disease, namely procaine hydrocholoride used intravenously, psychotherapy, nicotinic acid, intravenous histamine, streptomycin, differential nerve section, antihistamines, etc.

Dr. James K. Lees, with Mr. Donald Markle, has done a surgery of the effect of di-hydrostreptomycin on the hearing. Dr. Paul Lindenberg has been studying various methods for routine hearing tests for industrial, school, and military situations, in collaboration with Professor Fowler. He recommends the installation of screening audiometers for all routine hearing tests as it only takes two minutes to do an accurate test by this method.

The Department has continued to entertain many visitors from this country and abroad. There have been many educators from schools for the deaf, as well as acoustic engineers who come to inspect the equipment and management of the Lester N. Hofheimer Speech and Hearing Clinic. Notable among these were Professor Ronald MacBeth from Oxford University who lectured on cancer of the larynx, Professor Robert Owens from Cardiff who discussed various phases of otolaryngology, Professor Luzius Ruedi from Zurich who brought a film on the two-stage fenestration operation and discussed this delicate procedure, and Dr. Barney M. Kully from Los Angeles who showed a film and discussed the pathologies of the masopharynx.

DEPARTMENT OF PATHOLOGY

Professor Harry P. Smith, Executive Officer

The undergraduate teaching program in pathology is based upon the fact that courses in anatomy, physiology, and biochemistry deal mainly with normal structures and mechanisms. These courses are taught at a fundamental level, without undue effort to "slant" the instruction in the direction of clinical application. In the courses in pathology and microbiology, the student learns about various factors which disturb these normal structures and mechanisms, and about the disturbances themselves. In any given case, the sum total of the disturbances, anatomical, chemical, physiological, and clinical, when properly interpreted, provide the student with his definition of the disease in question. The instructional staff in pathology strives at all times, both in the classroom and in the autopsy room, to present the disturbances in their entirety; as far as possible, each disturbance of structure or function is assigned its proper place in the disease sequence.

Thus it is that the pathologist, by the very nature of things, must stress correlation and integration in his teaching. If this task is adequately performed, the student will pass from basic science to clinical medicine without "compartmentalization of knowledge" and without an obvious "break" in subject matter and viewpoint. In essence, then, integration across departmental lines is considered as one of the most important features of courses in pathology and microbiology. It is further believed that integration is not the exclusive prerogative of these two departments, but is a continuing obligation of the clinical departments.

In view of the educational advantages of this decentralized approach, the Department of Pathology views with misgivings the current efforts in one or two medical schools to bring the teaching of basic science under the control of an interdepartmental "team" of clinical and basic science teachers. It holds that artificial efforts to force integration of basic science and clinical medi-

cine will tend to substitute the practical viewpoints of applied science for the deeper viewpoints of fundamental science, and will tend to restore the vocational attitudes of eighty years ago. Specifically, the Department believes that basic science teachers should be subject to no outside interference in the conduct of their courses, but should retain their traditional freedom to teach fundamental knowledge as they see it, without "guidance" by departments which conduct courses later on in the curriculum. That which impairs the independence of the basic science teacher will destroy his self-respect and his sense of responsibility. As a result the basic science departments will lose prestige and will be crippled in their efforts at staff recruitment.

At the graduate level, our Department of Pathology recognizes its obligation to provide specialized consultation service and scientific cooperation to clinical departments in their programs of research and patient care. Subdivisions of neuropathology, pediatric pathology, and oral pathology have existed for a number of years. A division of orthopedic pathology has been organized quite recently. These specialized divisions are staffed by individuals having broad training in general pathology.The divisions have definite assignment of space and budget, and they have a number of service functions in common. Nevertheless, they enjoy professional autonomy within the administrative framework of the Department. The educational activities are coordinated by common consent and through mutual understanding derived from a common background of training and experience. These specialized divisions participate in undergraduate instruction but their functions are mainly at the graduate level, in research, hospital service, and residency training, all in close cooperation with the corresponding clinical departments. The division of general pathology, on the other hand, has its responsibilities in the broad fields of medical theory and practice. It has a major role in undergraduate teaching and in conduct of autopsies on adults. In this division, Drs. Robert W. Coon, Joseph Seronde, Jr., and Wellington B. Stewart have been promoted to the rank of Assistant Professor.

Professor Joseph E. Flynn continued as editor of the *Transactions of the Conferences on Blood Clotting and Allied Problems,* sponsored by the Josiah Macy, Jr. Foundation. He is on the Editorial Board of the journal, *Circulation* and was recently appointed to the Editorial Board of a new journal, *Circulation Research.*

The division of neuropathology under Professors Abner Wolf and David Cowen performed 75 autopsies and studied 504 surgical biopsies. Professors Wolf and Cowen, in collaboration with members of the Departments of Neurology and Neurological Surgery, have continued their study of brain tumors. Dr. Frederick Boykin, assigned for one year as a fellow in neuropathology, carried out experimental work on brain tumors in rodents. Material on chronic progressive Wernicke's encephalopathy in children is being

studied by Dr. Irwin Feigin and Professor Wolf. Dr. Stanley Aronson, a volunteer fellow in neuropathology, studied the reaction of tetrazolium in the nervous system in collaboration with Professor Wolf and Dr. William Antopol of the Beth Israel Hospital. The effect of neopenil on toxoplasmosis is being observed by these investigators as well. Professors Cowen and Wolf are continuing their studies on the effect of prenatal factors upon the occurrence of lesions of the nervous system.

The division of orthopedic pathology also holds weekly conferences, in collaboration with residents and attending staff of the Department of Orthopedic Surgery.

The autopsy service in the pediatric division has increased greatly during the past few years, partly because of the addition of a new unit for the care of premature infants. Along with this, there has been increased interest in the problems of prematurity. A monthly conference on this problem has been organized, with collaboration of pediatricians and anesthesiologists interested in the resuscitation of infants. Divisional conferences also include a monthly clinical-pathological conference, as well as weekly conferences for the benefit of students.

The pathology service at the nearby Francis Delafield Hospital under the direction of Professors Arthur Purdy Stout and Edith E. Sproul now functions as an integral part of the pathology divisions in the Medical Center. Arrangements have been made for rotation of resident staff to the Delafield Hospital, thus providing wider experience in various fields. The volume of material is increasing rapidly at that hospital, and is already more than adequate, both in the autopsy room and in the field of surgical pathology. It is hoped that other branches of clinical pathology can be utilized for residency training, thus giving a well-rounded training to those who are interested in the practice of laboratory medicine.

The services at affiliated hospitals, Goldwater Memorial, Mary Imogene Bassett, Montefiore, Mount Sinai, and Roosevelt, continue to cooperate in teaching programs. All have active programs of research.

Professors Flynn and Coon have continued the studies on blood coagulation outlined in last year's annual report. The number of known components of blood clotting has increased considerably in recent years. It is now clear that one cannot hope to understand the mechanics by which they interact, unless one can isolate each one, free of the others. This is gradually being accomplished by Professors Flynn and Coon. Preparation of the components is dependent upon sound assay procedures; these procedures, in turn, require purified components. It is thus evident that purification, perfection of assay, and study of reaction mechanisms are interrelated, and must be studied simultaneously.

Professor Seronde has continued his work on antithrombin and the heparin

co-factor. He has constructed solubility curves of mixtures of the two factors in a system of ammonium sulphate and citric acid and has secured added information regarding the properties and state of purity of each component.

Professor Stewart has continued his investigation of iron metabolism in collaboration with Drs. Philip S. Vassar and Robert S. Stone. A study of dietary factors influencing iron absorption and storage in rats was begun in collaboration with Professor Maurice E. Shils of the School of Public Health. Studies of some factors possibly influencing the life span of canine erythrocytes have been continued. These studies are being carried out with the aid of the radioactive isotopes of iron and sodium.

Professor Wolf and Dr. Frederick Boykin have studied a group of astrocytomas of the fourth ventricle, with special reference to their pathogenesis. Assisted by Dr. Eleanor Izquierdo, Professors Wolf and Cowen have surveyed the problem of amyloid deposition in the nervous system. Professor Wolf and Dr. William Newman of the Kingsbridge Veterans Administration Hospital have reported their findings on non-infectious granulomatous angiitis of the nervous system. Drs. Paul Kolisch and Estelle Geller, also of the Kingsbridge Veterans Administration Hospital, have collaborated with Professor Wolf in studies on the effect of cortisone and pyromen on brain wounds and on regeneration of the spinal cord in the rat.

Collaboration has continued between Professor Wolf and Professor Elvin A. Kabat of the Department of Bacteriology on experimental studies of disseminated encephalomyelitis in the monkey. Dr. Irwin Feigin of Mount Sinai Hospital has continued his studies on the histochemical demonstration of enzymes. Dr. Stanley M. Aronson, in collaboration with Professor Gregory Shwartzman of the Department of Bacteriology has studied the effect of cortisone on the development of poliomyelitis in the normally resistant hamster, and on the experimental disease in monkeys.

Professor Beryl H. Paige, has also continued her studies on still births and neonatal deaths at Sloane Hospital, assisted by residents of that Hospital.

Professor Dorothy H. Andersen has continued her study of cystic fibrosis and celiac disease, in collaboration with certain members of the Department of Pediatrics. Professor Andersen has also served as a member of the Committee on Neonatal Mortality of the New York Academy of Medicine, and as a member of the editorial committee responsible for the report. She has also helped to edit heart files of the Medical Film Institute and has joined in a symposium on carbohydrate metabolism, held in November at the Johns Hopkins University School of Medicine. She was a guest speaker in June at the annual Summer Clinics of the Denver Children's Hospital.

Professor Theodore F. Zucker and Dr. Lois M. Zucker are making additional studies on a "countertoxic" factor which eliminates the toxicity of acetyloamino-fluorine when used experimentally as a carcinogen.

Professor Henry S. Simms has continued his studies on the relationship of "lipfanogens" and "anti-lipfanogen" to the problem of lipid deposition in arteriosclerosis.

Dr. Charles R. Harmison has joined Professor Simms and is working on the purification of the anti-lipfanogen. Dr. Benjamin N. Berg, working with Professor Simms, is studying the accumulation of anatomical lesions in rats with advancing age. He is also making a study of changes in blood pressure, electrographic tracing and tetrazolium reactions in the tissues, as related to age.

Drs. Hans Kaunitz and Charles A. Slanetz have continued their investigations into the nature of the vitamin-A-like factor previously found in lard distilliate.

Drs. Kaunitz and Slanetz have also made a systematic study of an eight-year experience in the use of highly purified diets in regard to growth, fertility, litter size and life span.

DEPARTMENT OF PEDIATRICS

Professor Rustin McIntosh, Executive Officer

Fundamental changes in the program of pediatric teaching were instituted in June, 1951. The third-year class, instead of beginning its introductory work in pediatrics in December in the form of weekly two-hour sessions for the entire class, was put on the block time system from the first week in June. A group of fifteen to twenty students now devotes practically full time to pediatrics during five and a half weeks. With each successive group the earliest teaching exercises must of necessity be didactic in form; but as rapidly as possible students are given responsibility under supervision, so that their participation in the work of the Out-Patient Department approximates that which previously had been deferred until a student's fourth year. So far as pediatric instruction is concerned, the third year has now become, like the fourth year, a twelve month program.

Beginning in June, 1951, fourth-year students have had only one month of required pediatrics, but since many students in this year's class appreciated that one month constitutes short rations when preceded only by the old style didactic introductory course, a considerable number elected to apply an additional month of free time to pediatrics.

The impact of the revised pediatric course on the undergraduate student cannot be fully assessed until another year has elapsed. So far as the new third-year course is concerned, it represents an unquestioned improvement over its predecessor. The value of the fourth-year clerkship is more problematical. In the future, fourth-year students will not have an additional month

to devote to pediatrics and must content themselves with a single month's clerkship. In view of the undeniable importance to all physicians, whether specialists or general practitioners, of a firm grounding in pediatric training, and in view of the fact that two months of practical clinical work in succession are more than twice as valuable as a single month, it remains to be seen whether the net result constitutes an improvement over the old program.

An important aspect of the new curriculum is its heavy demand upon pediatric instructional time. The division of the class into small units for seminars and discussions, rather than lectures, and the trend toward individual teaching, both in the hospital and in the clinic, have thrown a significant added burden on the teaching staff.

The resignations of Dr. David McL. Greeley, who accepted the appointment as Assistant Dean of Boston University School of Medicine, and of Dr. Mary E. Hyman were accepted with regret.

New appointments include those of Dr. Annie V. Scott, Visiting Professor from Cheeloo University, China; Dr. Alice M. Goodfellow, Assistant; Dr. Katherine Sprunt, National Research Council Fellow; and Virginia N. Wilking, Fellow in Pediatric Psychiatry under the United States Public Health Service.

Research activities in pediatrics continue to suffer serious restriction because of limited laboratory space. Due appreciation must be expressed to Presbyterian Hospital for its loyal and generous efforts to relieve this distressing situation by making available to the Department certain areas in the Hospital which have been temporarily converted into research laboratories. The number and variety of projects under active investigation reflect the interests of the members of the Department.

Professor Hattie E. Alexander, in collaboration with Miss Grace Leidy and Professor Stephen Zamenhof of the Department of Biochemistry, has continued her ingenious study of the genetics of *Haemophilus influenzae* and of the chemical structure of bacterial genes. With Miss Winfred Redman, Professor Alexander has demonstrated that extracts containing desoxyribonucleic acid, derived from strains of *Neisseria meningitidis,* are capable of functioning as genes. Comparable studies of the biology of *H. pertussis* are being carried out in Professor Alexander's laboratory.

With Dr. Walter R. Kessler, Professor Dorothy H. Andersen has made a study of a group of patients who showed the syndrome of heat prostration, demonstrating that chilren with fibrocystic disease of the pancreas are especially liable to suffer in this way. Professor John Caffey has described the early skeletal changes which accompany certain congenital disturbances of growth.

Professor Richard Day and Dr. Alice M. Goodfellow, in collaboration with Dr. Gustav J. Beck of the Department of Medicine and Professor Virginia

Apgar of the Department of Anesthesiology, have made a study of pressure-time relations in the safe correction of atelectasis in the lungs of experimental animals. Certain principles of insufflation have been clarified which, it is hoped, may be applicable to newborn infants with collapsed lungs.

Professor Paul A. di Sant'Agnese has made an intensive study of a group of patients with cystic fibrosis of the pancreas who also experienced lobar atelectasis and obstructive emphysema. Dr. Alice M. Goodfellow, together with Professor Andersen and Dr. William A. Silverman, made a study of the effect of adrenocorticotrophic hormones on the adrenal glands and bones of premature infants. Dr. Ruth C. Harris completed some preliminary and highly suggestive studies of the rule of glucose-6-phosphatase in the pathogenesis of glycogen storage disease. She has also devised and successfully applied an improved technique of cholecystography appropriate for use in small infants. Professor Conrad M. Riley completed a clinical study of a large group of patients who presented the syndrome of familial autonomic dysfunction with defective lacrimation, an entity which Professor Riley originally described some years ago on the basis of a much smaller experience. Dr. Silverman, in collaboration with Professor Day and Professor John W. Fertig of the School of Public Health, has made a careful study of the incidence and correlations of retrolental fibroplasia. Together with Professor Day and Dr. Frederick Blodi of the Department of Ophthalmology, Dr. Silverman measured the inhibition of growth and other clinical effects of ACTH administered to premature infants. Dr. Katherine Sprunt has continued studies of a rickettsia which she isolated while working in the Research Institute of the New York City Department of Health. Drs. James A. Wolff and Frederick H. von Hofe have described examples of a new type of familial erythroid multinuclearity.

In the course of the academic year, Professor Alexander took part in a symposium on microbial genetics, held at Cold Spring Harbor. Professor Caffey delivered the David Murray Cowie Memorial Lecture at the University of Michigan, and later participated in the postgraduate pediatric seminar organized by the Baylor University College of Medicine. Professor Day addressed the pediatric staffs of Howard University and Temple University. Professor McIntosh attended, as one of its Vice Presidents, the Second International Congress of Poliomyelitis, held in Copenhagen in September, 1951. He addressed a joint meeting of the Danish Pediatric Association and the Danish Society of Ophthalmologists on "Recent Studies in Retrolental Fibroplasia." In October, he also delivered a short talk at the exercises which marked the formal opening of the Hospital for Sick Children in Toronto.

Among numerous visitors to the Department may be mentioned Dr. T. S. Cho of Severance Union Medical College, Seoul, Korea; Professor Nelson Ordway of Louisiana State University; Professor Antonio Ortiz of the Uni-

versity of Puerto Rico; and Sir James Spence of Durham University. Talks were given to the pediatric staff by Dr. Howard Eder of Cornell University Medical College; Professor Robert Debre of the University of Paris; Drs. Rene J. Dubos, Sam Granick and Howard A. Schneider of the Rockefeller Institute; Drs. Macklin McCarty and Frank L. Horsfall, Jr. of the Hospital of the Rockefeller Institute; and Dr. Bernard Davis of the United States Public Health Service.

Dr. Cathleen M. Elliott held the L. Emmett Holt Fellowship during part of the year.

DEPARTMENT OF PHARMACOLOGY

Professor Harry B. van Dyke, Executive Officer

The Department of Pharmacology has received numerous requests from other academic institutions to recommend candidates to fill the many vacancies that exist in this field. As a result, three of our younger men have accepted outstanding posts. In July, 1951, Dr. James Foulks at the conclusion of his tenure as a United States Public Health Service Fellow accepted the position of Professor and Chairman of the Department of Pharmacology at the newly established University of Vancouver Medical School, Vancouver, British Columbia. At the end of the current academic year Professor George B. Koelle will assume new duties as Professor of Pharmacology at the University of Pennsylvania School of Graduate Medicine. Dr. Everett W. Maynert, Associate in Pharmacology, will leave in September to join the staff of the Department of Pharmacology at Johns Hopkins University School of Medicine. New appointments include Dr. Paul Brazeau, who completed his Ph.D. training in June, 1952, and Dr. Elizabeth Dickason King, United States Public Health Service Research Fellow in Pharmacology.

The course for the second-year medical and dental students followed its usual pattern of lectures, laboratories, demonstrations, and conferences. Many of these activities would not have been possible without the services of several individuals who were not formal members of the teaching staff. These include Drs. Herbert J. Bartelstone, Kazuya Kamijo, John B. Hill, and Paul Brazeau. Dr. Bartelstone in particular engaged in full-time teaching despite the pressure of his duties as an officer of the United States Public Health Service. In addition, demonstrations and lectures in specialized fields were given to the second-year class in pharmacology by Professor Virginia Apgar of the Department of Anesthesiology, Professor John W. Fertig of the School of Public Health, Professors John V. Taggart and Alfred Gellhorn and Dr. John R. West of the Department of Medicine, and Professor Sidney Carter of the Department of Neurology.

Professor Harry B. van Dyke has continued his studies on the physiology of the neurohypophysis and the chemical nature of the antidiuretic hormone. In collaboration with Dr. Rose G. Ames, bioassay techniques for the determination of the antidiuretic hormone have been refined to the point that plasma levels can be determined. The secretory response of the neurohypophysis of normal and adrenalectomized animals to a variety of physiological stresses has been defined. In addition Dr. Ames has studied the effects of the antidiuretic hormone on renal electrolyte excretion under varying salt loads and has continued her observations on water metabolism in newborn full-term and premature infants.

During the last half of the academic year, Professor van Dyke was on sabbatical leave. Most of his time was spent in England where he worked at the Medical Research Council Laboratories. In addition, he visited and lectured at many pharmacological laboratories in England and on the continent.

Professor Alfred Gilman and Dr. Paul Brazeau continued their studies on the renal excretion of electrolyte. The isolated perfused kidney has been developed to a point where it approaches in functional capacity that of the organ *in situ*. In addition, approximately twenty steroids chemically related to adrenocortical steroids have been examined for their effects on the renal tubular absorption of electrolyte.

Professor Koelle has been actively engaged in studies relating to the autonomic nervous system. He has continued his classical observations on the distribution of cholinesterases in nervous tissue by means of histochemical localization. In addition, in collaboration with Dr. Kamijo and Dr. Duncan A. Holaday of the Department of Anesthesiology he has investigated quantitatively the effects of inhibition of specific cholinesterase in autonomic ganglia on ganglionic transmission. Professor Koelle, Dr. Kamijo, and Dr. Robert B. Hiatt of the Department of Surgery have also studied the abnormalities of the acetylcholine-cholinesterase system in portions of the colon resected from individuals with Hirschsprung's disease.

Miss Winifred J. Angenent of the fourth-year medical class completed a particularly outstanding investigation in collaboration with Professor Koelle for which she received the Borden Undergraduate Research Award. Miss Angenent demonstrated that DOPA-oxidase which is present in greater amounts in dark than in light eyes is capable of oxidizing the chemical mediators of adrenergic nerves. This is believed to account for the differential action of mydriatics in light and dark-colored irides.

Dr. Everett W. Maynert has continued his studies of the metabolism of hypnotic and anticonvulsant drugs. Mass-spectrometric determinations of N^{15} required for these studies were generously made by Professor David Rittenberg and Mr. Irving Sucher of the Department of Biochemistry.

Dr. Bartelstone has continued his close association with the Department of

Pharmacology despite his duties as Senior Assistant Dental Surgeon at the United States Marine Hospital on Staten Island. He has been actively investigating the permeability of dental enamel and relating changes in the internal environment of the tooth to those which occur externally.

Numerous distinguished foreign scientists visited the Department during the course of the year. Among these, the student body and the faculty were privileged to hear formal presentations by two outstanding British pharmacologists, Professor J. Harold Burn of Oxford University and Professor E. B. Verney of the University of Cambridge.

All members of the Department were actively engaged in extra-curricular activities throughout the year. These included lectures to the house staffs of many hospitals and to numerous scientific societies. Professor Koelle delivered the Hachmeister Memorial Lecture at Georgetown University School of Medicine and Professor Gilman spent one week as Visiting Chief at the Atlantic City Hospital where he conducted a series of conferences in pharmacology and therapeutics. Professor van Dyke gave addresses at many European medical schools including Oxford University and the University of Edinburgh. Professor van Dyke continues to serve as Editor of the *Journal of Pharmacology and Experimental Therapeutics* and a member of the Committee on Growth of the National Research Council. Professor Gilman is serving on the editorial boards of the *American Journal of Physiology* and *Pharmacological Reviews* and as a member of the Pharmacology Study Section of the United States Public Health Service.

DEPARTMENT OF PHYSIOLOGY

Professor Magnus I. Gregeresen, Executive Officer

Professor Wilson C. Grant resigned at the end of the academic year in order to join the research staff of the Lederle Laboratories Division of the American Cyanamid Company. Professor Grant's contributions to the teaching and research activities of the Department have been outstanding and his resignation was accepted with great reluctance. Other changes in the staff include the appointment as Assistant Professor of Dr. Nicholas Di Salvo who graduated from the Columbia University School of Dental and Oral Surgery in 1945 and received his Ph.D. degree in physiology at the June 1952 commencement while a United States Public Health Service Fellow; the appointment of Dr. Charles J. Pallavicini as Research Assistant in Physiology; and the advancement of Drs. Thomas H. Allen and William W. Walcott from Assistant Professors to Associate Professors.

Professor Shih-Chun Wang was on sabbatical leave during the first half

of the year working with Professor Heymans in Ghent and visiting various laboratories abroad. For this period Professor Wang was awarded a fellowship from the Guggenheim Foundation.

As a consequence of a generous grant from Eli Lilly and Company arrangements were made for Dr. E. B. Reeve of Guy's Hospital Medical Research Unit, London, England, to spend nine months in the laboratory as Research Fellow working with Professor Gregersen and other members of the staff on certain fundamental problems in the measurement of blood volume.

As in the past, the entire staff took part in the teaching of physiology for first-year medical and dental students. Administrative details of the medical school course were handled by Professor William L. Nastuk and the dental course was supervised by Dr. Norman Alpert. Dr. Alpert also taught the physiology course for the occupational therapists and Professor Louis J. Cizek gave the course for the physical therapists.

Professor Grant was the departmental representative for the Summer Session teaching program in physiology and Professor John L. Nickerson took an active part in the teaching of a graduate course in biophysics. Physiology in the General Studies program was given for the first semester by Professor Allen and Professor Nastuk gave the General Studies course in physiology in the Summer Session. Professor Walter S. Root again gave a series of lectures on the autonomic nervous system for students at the Psychoanalytic Clinic for Training and Research.

There is agreement that the primary objective for all groups of students must be to develop a working knowledge of the principles of physiology. This can be achieved only by patient and critical consideration of the original evidence out of which the principles have been developed. Early emphasis on practical applications at the expense of training in the fundamental and theoretical aspects of a basic science does not develop to the fullest the student's capacity to think independently or creatively and to solve the unforeseen problems which he will surely meet in medical practice as well as in research. Furthermore, continued growth of a profession demands that students be awakened to their responsibility for making contributions to the intellectual capital of the field in which they choose to work.

Professor Gregersen served as member of the committee which organized the Conference on Shock sponsored by and held at the New York Academy of Sciences in November, 1951. Professor Root took an active part in promoting passage of the Metcalf-Hatch bill in the New York State Legislature authorizing the use of unclaimed animals for medical research. Professor Root was also Chairman of a Committee of the American Physiological Society on the use of motion pictures as teaching aids.

Professor Nickerson and Dr. James A. L. Mathers of the Department of Medicine have continued theoretical and clinical studies of the ballistocardiography with support from the United States Public Health Service. Some of the clinical studies were made in collaboration with Professor Ralph A. Deterling, Jr. of the Department of Surgery, Dr. Leon Moses of the Department of Psychiatry, and Dr. Norman P. Hill of the Mary Imogene Bassett Hospital in Cooperstown. Studies on the circulating red cell mass with the use of red cells tagged with radioactive iron were made by Professor Nickerson in collaboration with Professor Gregersen and Dr. Reeve.

Professor Root and Dr. Alpert have been working on a problem of the kinetics of lactate metabolism, and Professor Root with Carl M. Barlow, third-year medical student, completed a study on a caloric technique for measurement of blood flow in the feline bladder. Also completed, with Professor Grant, was a study on the effect of sympathectomy on the polycythemic response of dogs to simulated altitude. In addition Professor Grant worked with James A. Smith, a fourth-year medical student, on the influence of thyroidectomy on the polycythemic response of rats to simulated altitude. Professors Grant and Root completed a review, "The Fundamental Stimulus for Erythropoiesis," which will shortly appear in *Physiological Reviews*.

A comparative study of the effects of sodium pentobarbital and ether on the bleeding volume of dogs was completed by Professor Walcott and Dr. Wang Chun-i, Visiting Fellow who came here from the National Defense Medical Center in Taiwan, on a fellowship granted by the American Bureau for Medical Aid to China. More recently Professors Gregersen and Walcott have initiated a program for the study of metabolism in relation to lean body mass. This program is supported by the United States Air Force. Professor Walcott and Dr. Alpert have been working on the problem of oxygen debt during and following severe hemorrhage.

Professor Nastuk has continued investigation of the fundamental mechanism involved in neuro-muscular transmission, and research on anticurare compound 3 with supporting funds from the Hoffman LaRoche Company. He and Mr. S. J. Solms, Tausend Fellow, have devised an electronic circuit which will be of value to investigators studying membrane potentials with intra-cellular microelectrodes, and also completed with Mr. Jack T. Alexander an electro-mechanical device useful in the preparation of microelectrodes for intra-cellular recording.

Professor Cizek is investigating differences in water output through the fecal route in various species of animals and the water turnover and food ingestion in rabbits to determine the normal range in this species. Professor Cizek is also investigating the variations in the fluid content of the gut in order to evaluate this factor in determinations of total body water. Professor

Cizek and Dr. K. C. Huang, Visiting Fellow holding a Fellowship from the United States State Department, are continuing the study of water balance in dogs with dietary salt deficiency and Dr. K. C. Huang is carrying on a parallel investigation in rabbits. Professor Cizek is also collaborating with Professors Gregersen, Walcott, Allen, and Dr. Pallavicini on a further extension of the studies, started during the summer of 1951, of acute salt deficiency in man. This year John Schullinger and Manuel Ochoa, first year medical students, participated in the tests.

Mr. Ochoa and Mr. Robert Roth were granted summer research fellowships by the University and are working with Professors Allen and Gregersen on the differences in spectral properties of the blue dye T-1824 in plasma from various laboratory animals. Through the cooperation of Dr. Goss of the New York Zoological Society it has been possible to extend these studies to species not available in the laboratory. Plans for collaboration with the Bronx Zoo on other problems in comparative physiology are under consideration.

Doctor Di Salvo has continued the investigation of thirst induced by hypertonic fluids injected intravenously into dogs. The method for paper pulp extraction of T-1824 developed by Professor Allen has been valuable in several types of experiments where the plasma level of dye is difficult to measure by direct photometry.

Dr. Reeve and Professor Gregersen with the collaboration of Professor Allen, Dr. Hubert S. Sear and others have carried on an extensive series of investigations on measurement of blood volume to compare results obtained with the plasma dye method and P^{32} method. Mrs. Louis Wang, United States Public Health Service Fellow, has recently compared the dye and P^{32} methods in normal and splenectomized rats. Most of these investigations were financed by the Eli Lilly and Company grant and more recently by the United States Air Force contract. With the cooperation of the School of Aviation Medicine, experiments are now in progress to test the volume methods in dogs after prolonged exposure to simulated high altitudes.

The laboratory has made a modest beginning in the study of radiation sickness. A year ago Professors Wang and Gregersen carried on a few exploratory experiments on dogs. Subsequently, Professor Gregersen was urged by members of the Radiation Committee of the United States Public Health Service to undertake a study of the effect of X-irradiation on blood volume in monkeys, and a contract with the United States Public Health Service was arranged to carry on this and related investigations. Professor Gregersen and Dr. Pallavicini in seeking to determine the effects of radiation on the water content of brain tissue in dogs have studied the differences in electrolyte, water, and fat content of grey and white matter. This seems to arise from the possibility as indicated also by other recent investigations, that fat plays an active part in the electrolyte distribution in brain tissue.

DEPARTMENT OF PHYSICAL MEDICINE AND REHABILITATION

Professor Robert C. Darling, Executive Officer

The activities of physical medicine and rehabilitation were amalgamated and given departmental status on January 1, 1952, with the assistance of an anonymous gift to the University for that purpose.

This new Department brought together the following four existing programs without major change: the research facilities built up under the Baruch Gift for Physical Medicine, the clinical treatment and research activities in the various units of the Columbia-Presbyterian Medical Center, the graduate program for training residents and fellows in physical medicine and rehabilitation which for the past three years has combined support from the Hospital residency program and fellowship support from the Baruch Gift, and the training courses in physical and occupational therapy. In addition, the Medical Service of the Institute for the Crippled and Disabled became more closely aligned with the medical program at the Columbia-Presbyterian Medical Center, with the signing of a tripartite affiliation on January 31, 1952 between the University, the Institute, and the Presbyterian Hospital. Individual medical staff members at the Institute have been nominated by the University since the affiliation agreement of 1946; the new closer affiliation allows the establishment of a full-time Director of the Medical Service who will be an important member of the Department of Physical Medicine and Rehabilitation. To strengthen the affiliation further, Professor Robert C. Darling became Chairman of the Medical Board of the Institute. Thus the new Department completed the framework for development in the chief areas concerned in the specialty: basic research, treatment in an acute hospital, teaching of physicians and various ancillary specialties, and total rehabilitation services from bed to job.

On April 1, 1952 Dr. Edward E. Gordon was appointed Associate Professor of Rehabilitation Medicine and Director of Medical Services at the Institute for the Crippled and Disabled, thus completing the organization mentioned above. Professor Gordon has recently conducted research in problems of the rehabilitation of tuberculosis patients. He is continuing research on the energy cost of various occupational tasks with the aid of a grant from the National Tuberculosis Association and the Ohio State Tuberculosis Society.

Undergraduate medical teaching in this field emphasizes the integration of physical medicine in the management and evaluation of various diseases of the neuromuscular and skeletal systems. To this end several members of the Department contributed to the undergraduate teaching in physical diagnosis and orthopedics. Another objective is the education of the undergraduate concerning the scope and purpose of medical rehabilitation.

Graduate training of fellows and residents has been a major interest. The urgent, nationwide need for highly trained specialists in the field, as well as sound educational principles, dictates this emphasis. The number of trainees on this program is still small but growing.

With the cooperation and support of the Coordinating Council for Cerebral Palsy in New York City, a three-month postgraduate course in cerebral palsy was given. This is the first of a planned series of such courses. Two physicians, six physical therapists, and six occupational therapists took the first course, which included a comprehensive series of lectures and detailed practical experience at several treatment centers throughout the city. This course was well received and proved the educational soundness of such a collaborative venture between the University and various community agencies.

The staff cooperated with the Institute for the Crippled and Disabled in their several programs designed to instruct segments of the community in the scope and significance of rehabilitation. These included a full day session for rehabilitation workers in insurance companies, a meeting for the New York State Compensation Board, and an instruction series for brace and prosthesis workers.

The new specially constructed room for studies of exercise on a treadmill and for measurements at controlled temperature and humidity has been in regular operation by members of the Department, as well as workers in other departments. Professor Darling and Miss Ethel Shea have continued work on the changes in plasma volume occurring during exercise. More recently, they have been studying the sweat of children with fibro cystic disease of the pancreas.

Dr. Daniel C. Tosteson of the Department of Medicine, Miss Shea, and Professor Darling completed and published their work on electrolyte shifts between red cells and plasma in the blood of patients with sickle cell anemia. Dr. Milos Lota has built up a laboratory for testing and development of apparatus. He has developed a simple portable electric thermometer, has made exact recordings of the electrical currents generated by the various commercial electrotherapeutic apparatus, has made progress in the development of an electrotherapeutic generator of his own design and is currently working on a volume plethsymograph for the entire lower extremity.

Mrs. Marion Strauss Lesser, with Professor Darling, is approaching completion of her follow-up study of patients treated and trained at the Institute for the Crippled and Disabled.

Professor William B. Snow, in addition to his heavy responsibilities for the hospital treatment centers in physical and occupational therapy and the supervision of the training courses in physical and occupational therapy, has contributed widely in professional circles. With Dr. James Coss, Jr. of the Department of Medicine, he has continued work on the combined use of cortisone, ACTH, and intensive physical medicine in rheumatoid arthritis, on which

subject they presented exhibits at the New York State Medical Society meeting and the American Congress of Physical Medicine. Professor Snow, as a member of the Orthopedic Advisory Committee of the Department of Health and the Board of Education of New York City, has been chief advisor for the setting up of a new class for cerebral palsy children in Public School 85. He has been active as a member of the Coordinating Council for Cerebral Palsy and took part in a panel discussion at their Institute. As consultant to the Surgeon General's Office of the United States Army, he has visited and taught at several Army General Hospitals. In September, 1951, he was elected First Vice President of the American Congress of Physical Medicine. He was a member of the legislative advisory committee concerned with setting up the New York State law for licensure of physical therapists.

Professor Arno D. Gurewitsch has carried his teaching activities into several countries of the world. In November, 1951, he gave several lectures by invitation on the treatment of poliomyelitis at the Hospitale Infantil in Mexico City. In February and March, 1952, he visited the Near and Far East, observed the medical activities in those areas, and lectured extensively in Israel, Pakistan, and India.

The first steps have been made toward setting up facilities for a physical medicine and rehabilitation service at the Francis Delafield Hospital.

PHYSICAL THERAPY

Throughout the curriculum greater use has been made of field trips as a means of practical orientation, especially among the advanced-standing students, and of visual aids, particularly in the classroom at the Institute for the Crippled and Disabled.

A high percentage of students receive aid in financing their education: seventeen receive complete aid and five supplementary aid from the National Foundation for Infantile Paralysis; seven aid from the Veterans Administration; four from other sources. With the scholarship funds from the National Foundation for Infantile Paralysis decreasing and with higher tuition fees, there will be an increasing need for scholarship funds from other sources in the future.

Three new special lecturers have been obtained: Mildred E. Harris, Specialist in Relaxation; Dr. Edith H. Borneman, Instructor in Swimming and Physical Education at the College of the City of New York; Dr. Charles R. Goldstine, Director, Prosthetic and Orthopedic Appliance Shop, Institute for the Crippled and Disabled. Miss Blanche Talmud, Supervising Therapist, Institute for the Crippled and Disabled, previously a special lecturer in recreation, this year taught rehabilitation. Upon the sudden illness of Professor Floy Pinkerton in the middle of the year, Miss Elizabeth Addoms, Technical Director, School of Physical Therapy, New York University, kindly volunteered four lectures in kinesiology.

Throughout the year we have received several requests from professional and voluntary organizations, physical therapists and universities, both in this country and abroad, for information regarding our educational programs, professional trends and physical setup. This year our foreign visitors have come from Holland, Japan, India, England, Norway, and Sweden.

Professor Pinkerton, Director of Training Courses for Physical Therapists, has been on leave of absence since December, 1951, because of illness.

The physical therapy aspects of the postgraduate course in cerebral palsy, mentioned above, were handled through the Director of Training Courses in Physical Therapy, in cooperation with Professor Snow, the Medical Director, and Miss Marguerite Abbott, the Executive Secretary of the Coordinating Council for Cerebral Palsy. Miss Esther Snell as an Instructor in Physical Therapy was field supervisor of the physical therapist students during the first course but she resigned at the end of the academic year.

Professor Pinkerton was Treasurer and Chairman of the Committee on Public Laws of the American Physical Therapy Association; Chairman of the Legislation Committee of the New York Chapter of the American Physical Therapy Association; and Chairman of the Inter-Chapter on Legislation in New York State until her illness.

Miss Mary E. Callahan, Associate Director of Training Courses for Physical Therapists, again this year is Associate Editor of the *Physical Therapy Review* and was also a member of the Education Committee of the New York Chapter of the American Physical Therapy Association.

OCCUPATIONAL THERAPY

Among the students in residence during the year were visitors from Puerto Rico, Canada, Malaya, Hawaii, and China. A recent report from the American Occupational Therapy Association indicates the relative standing of our graduates on the four Registration Examinations in 1950–1951 to be in the third place with relation to the other twenty-four schools.

Recent increases in tuition rates highlight the need for scholarship funds for students in occupational therapy if we are to continue to attract those with the greatest potential talent in the field.

Within the past year there have been several changes of the administrative staff initiated by the resignation of Miss Marjorie Fish as Assistant Professor and Director of Training Courses. Miss Fish left to accept the key position of Executive Director of the American Occupational Therapy Association. Miss Marie Louise Franciscus was promoted to her place as Assistant Professor and Director of Training Courses. We were most fortunate in securing the services of Miss Virginia Kilburn as Associate Director of Training Courses. Miss Anita Slominski was appointed Instructor in Occupational Therapy to serve as the Occupational Therapy Field Consultant in postgraduate courses in cerebral palsy. We have welcomed two new Instructors to our teaching pro-

gram during the past year and are grateful for their interest and services. They are Dr. Norman Alpert, Instructor in Physiology, and Mrs. Helen Rikoon, Assistant in Occupational Therapy.

The clerkship program was continued in its third year with increased cohesion and meaning as an instructional aid. Due to an increased number of students and limited occupational therapy staff personnel at the New York State Psychiatric Institute and Hospital, further enlargement of the psychiatric clerkship assignment areas became necessary. Through the cooperation of Dr. Oskar Diethelm, Psychiatrist in Charge, Payne Whitney Psychiatric Clinic of the New York Hospital, students were assigned to the Occupational Therapy Department under the able supervision of Miss Mildred Spargo. We are most appreciative of the continued interest and cooperation of the Psychiatric Division of Bellevue Hospital and the New York State Psychiatric Institute and Hospital, and are grateful for the participation of the Payne Whitney Psychiatric Clinic in this clerkship program.

Further interest in our program was evidenced by the participation in clerkship seminars of the staff of the New York State Psychiatric Institute and Hospital. Professor Nolan D. C. Lewis and several members of the Department of Psychiatry have contributed generously of their time to enhance this teaching experience.

The Institute for the Crippled and Disabled teaching unit under the direction of Miss Edith Brokaw continues to be a model center for instruction in skills. The annual Open House and exhibition of student work were satisfying evidence to both staff and students of the accomplishments of the year. Teaching in this basic unit for craft instruction is ably supplemented by the instruction given by the Department of Fine and Industrial Arts, Teachers College, and by the Department of Graphic Arts, General Studies.

During the past year three clinical training centers have been dropped and three added. New centers include the Kessler Institute for Rehabilitation, West Orange, New Jersey, Cresson State Sanatorium, Cresson, Pennsylvania and the Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn, New York. The total number of regularly used clinical training centers is thirty-four.

On May 26, 1952, Directors from twenty-six of the occupational therapy training centers met in an all-day session at the Medical Center for the annual clinical training Directors' meeting.

During the students' spring vacation period the Associate Director visited ten of the training centers located in Maryland, District of Columbia, Virginia, North Carolina, and Georgia. Ten additional centers, not as yet utilized in our clinical program, were also visited.

Aside from those people already mentioned and in addition to our Medical Center staff, we have been privileged to bring our students the following outstanding lecturers: Miss Martha Matthes, Educational Director, American

Occupational Therapy Association; Mr. Arthur Eisenberg, Rehabilitation Executive, Montefiore Hospital Country Sanatorium, Bedford Hills, New York; Miss Betty Meredith Jones, specialist in dance and drama, London, England; and Miss Mary E. Brown, Director, Cerebral Palsy and Rehabilitation Service, Eastern New York Orthopedic Hospital School, Schenectady, New York.

Professor Franciscus is Associate Editor of the *American Journal for Occupational Therapy*. She is serving as a member of the Registration Committee and Education Committee of the American Occupational Therapy Association and is a member of the Board of Managers and of the Program Committee of the New York Occupational Therapy Association.

Miss Marguerite Abbott is a member of the Research and Application Committee, and Graduate Study Committee of the American Occupational Therapy Association. She is also serving as Chairman of the Committee on Special Studies and is a member of the Board of Managers of the New York Occupational Therapy Association, and Chairman of the Committee on Recruitment of Professional Personnel of the New York State Association for Cerebral Palsy.

Professor Franciscus has had a vocational guidance manual, *Opportunities in Occupational Therapy,* published. Miss Abbott has published *A Syllabus of Cerebral Palsy Treatment Techniques.*

DEPARTMENT OF PSYCHIATRY

Professor Nolan D. C. Lewis, Executive Officer

The programs of psychiatric instruction have been considerably expanded, particularly in the first and third years of undergraduate work, with increased emphasis on child psychiatry and psychosomatic medicine.

Research supported by grants from various foundations has progressed satisfactorily in the biochemistry of mental disorders, in heredity studies, and in the study of psychological factors in tuberculosis and in lung cancer.

A new division of pharmacology was organized at the Institute to study the effects of various drugs upon the psychoses. Professor Heinrich Waelsch is the principal research scientist in charge of this laboratory.

The problem concerned with the selection of the best psychosurgical methods as evidenced by the results obtained by various procedures is now in its third year and will be continued for at least another year. Two books will be published on this research during 1952.

Professor Armando Ferraro, Secretary General of the First International Congress of Neuropathology, made a trip to Rome, in May, for the purpose of conferring with Dr. Mario Gozzano, President of the Congress, and to make final arrangements for the Congress which will be held in Rome, September

8–13, 1952. The Congress will be attended by the most outstanding neuropathologists of the world and will discuss the histopathologic aspects of demyelinating diseases, vascular diseases, schizophrenia, mental deficiencies, and senility.

Dr. William A. Schonfeld has continued his research on personality problems associated with gynecomastia in adolescents. Dr. Adolf Zeckel has continued his work with Professor Edmund P. Fowler, Jr. of the Department of Otolaryngology on Meniere's disease.

There have been two books and thirty-five papers published and eighteen lectures given by members of the psychiatric staff to various scientific bodies.

The curriculum at the Columbia University Psychoanalytic Clinic for Training and Research is considered a sound one which fills a real need in psychiatry. Now concluding its eighth academic year, the Clinic has shown a slow but consistent expansion.

Graduates who have undertaken academic careers in universities away from New York have continued to do outstanding work. The group at Tulane University of Louisiana School of Medicine has started to announce some of the results of the immense research project which has been under way for the past two years. Several staff members from the Clinic gave lectures at Tulane this year again and were more than ever impressed by the work being done by the five Clinic graduates who are on that staff. This year two of the students, who will complete their work this summer, have already accepted excellent academic positions, one in New York City and the other in Mexico.

Last fall, when a fourth year of training for students who are unable to complete all clinical requirements within the minimum three years became formally part of the Clinic program, a Colloquium, especially for this group, was organized. In addition to their clinical experience, supervisory sessions and conferences, these students regularly attended the two-hour Colloquium every Saturday morning. The senior staff members took turns leading the discussions which were chiefly concerned with the explanation of psychodynamic concepts and theories in terms of the clinical facts to which they refer. The students found these sessions highly stimulating and rewarding, and the staff members were equally enthusiastic about the Colloquium, which will be continued as a regular part of the program.

The schedule for theoretical qualifying examinations all of which were formerly held at the end of the third year, was changed so that the examinations in those courses completed in the first year are now held in February of the second year. Beginning in February, 1953, intramural psychiatry and neurology will be added to the subjects in which students are given a qualifying examination.

This year the senior teaching staff was handicapped by the death of Dr. Fanny Hann-Kende and by the fact that both Dr. David M. Levy and Professor George E. Daniels were on leave of absence. Dr. Levy was at the Institute

for Advanced Study at Princeton. Professor Daniels is expected to have recovered from his illness sufficiently to be back in September. The death of Dr. Hann-Kende is, however, an irreparable loss to the Clinic, not only because her outstanding teaching and clinical contributions have so tragically ended, but because she was a teacher of most exceptional personal attributes.

Staff members rallied to the emergency created by the absence of these three key teachers, with Dr. John A. P. Millet taking over much of Professor Daniels' work; Dr. Nathan W. Ackerman taking Dr. Levy's responsibilities; and Drs. Milton Sapirstein and Lionel Ovesey dividing the supervisory activities of Dr. Hann-Kende.

The supervision of therapy done by residents of the Psychiatric Institute by graduates of the Clinic under the direction of Professor Nolan D. C. Lewis and Irville H. MacKinnon has been expanded so that Drs. Aaron Karush, Ovesey, Weber, and Harrison each spend two hours a week in this activity. Drs. Karush, Ovesey, and Weber have also participated in the program of lectures for the postgraduate course in psychiatry and the New York State Resident Program.

In addition to their usual teaching, research, and community accomplishments in psychiatry, most staff members enlarged the scope of their work this past year. Typical examples of new activities by senior staff members are the publication of "Towards Unification of Training in Psychiatry and Psychoanalysis" by Dr. Henriette R. Klein, who also presented a paper entitled "Preliminary Report on a Study of Maternal Attitudes Based on Observations of Nursing Mothers" at the New York Academy of Medicine. She has represented the Clinic at meetings of the American Psychoanalytic Association, particularly on panels dealing with training standards.

Dr. George S. Goldman had his article, "Childhood Fears Today," published by *Child Study Journal* and was co-author, with three other Clinic staff members, Drs. H. Lee Hall, Milton Sapirstein and Richard L. Frank, of "Psychoanalysis," published in *Neurology and Psychiatry,* Volume VI.

Dr. Millet wrote the chapter "A Psychoanalyst's Viewpoint on Sexual Problems" for *Pastoral Psychology,* published in the Fall of 1951. He was President of the New York Society for Clinical Psychiatry and Chairman of the Professional Advisory Committee of the Rockland County Mental Health Association.

Dr. Raymond de Saussure wrote the chapter, "Principles of Psychodynamics," for 1951 *Yearbook of Psychoanalysis* and the "Essay of Biophysiological Speculations" to be published in a volume in honor of Maria Bonaparte. In August, 1951, he was named Chevalier de la Légion d'Honneur by the French Government.

Dr. Sandor Rado, Director of the Clinic, continued his usual numerous lecture engagements at Army and Veterans Hospitals, state hospitals, medical schools, and universities and his presentation of papers at scientific meetings.

He became a member of the Sub-Committee on Psychodynamics of the Conference on Psychiatric Education under the auspices of the American Psychiatric Association and Association of American Medical Colleges.

Dr. Sapirstein was appointed Senior Consultant in Psychiatry at the Veterans Administration Hospital at Kingsbridge.

Dr. Karush collaborated with Professor Daniels on "The Psychoanalyses of Two Cases of Ulcerative Colitis," accepted for publication in *Psychosomatic Medicine* and in *Psyche*. With Dr. Robert Hiatt he had "The Role of the Granulocyte as a Source of Lysozyme in Ulcerative Colitis" accepted for publication by the *Journal of Clinical Investigation*.

Dr. James P. Cattell who devotes practically full-time to his research and teaching career, published four papers on which he collaborated with Professor Paul H. Hoch and Dr. Harry H. Pennes: "Evaluations of the Results of Topectomy Operations"; "Report of the Psychiatric Discipline" (Second Columbia-Greystone Project) in *Psychosurgical Problems;* "The Effects of Mescaline and Lysergic Acid (d–LSD–25)"; and the 'Effects of Drugs: Theoretical Considerations from a Psychological Viewpoint."

Dr. H. Lee Hall gave seminars on supervision of psychotherapy at the Psychoanalytic Institute of the State University. Dr. Saul Karlen received three new hospital appointments, as Attending Psychiatrist at the Bronx Veterans Hospital, Adjunct Neuropsychiatrist at Lenox Hill Hospital and Assistant Chief, Psychiatric Clinic, Lenox Hill Hospital.

The monthly staff conferences which are held for two-hour periods have continued to improve in quality. Each student has presented one of his cases and each category of illness has been represented. This year, in addition to the case presentation, a student discussant has also presented physiological material. This material with the ensuing general discussion was wire-recorded.

The Medical-Psychiatric Service has been handicapped by the absence of Professor Daniels. During his absence the responsibilities for the running of the service were divided between Drs. Millet and Kenneth Kelley. Dr. Millet served as acting chief of the psychosomatic service. He also, with the assistance of Dr. Leon Moses, took charge of the lectures in psychosomatic medicine which are given to the students in the Psychoanalytic Clinic for Training and Research as part of their training program. Dr. Kelley supervised the administration of the Medical-Psychiatric Office.

Drs. A. N. Miranda-Rivera, Paul Ecker, and Edward Hornick have joined the staff to help with the ever-increasing consultation load which the service handles. This year we responded to requests for 196 consultations.

Dr. Karush has continued with his work at the Combined Ulcerative Colitis Clinic as the psychiatric consultant. Dr. Walter Stewart has attended grand medical rounds on Thursday mornings. Dr. Ecker attended the Arthritis Clinic as the psychiatric consultant.

The Psychological Factors in Amenorrhea, a research project undertaken in

cooperation with the Department of Obstetrics and Gynecology and under the sponsorship of a grant from the United States Public Health Service, has been completed. Drs. Kelley, B. Ruth Easser, Russell R. Monroe, and the late John Poe studied twenty-six cases of secondary amenorrhea.

Dr. Easser is continuing her collaboration with Dr. Marian D. Laird of the Department of Obstetrics and Gynecology and Miss F. Hogan, as adviser on some of the psychological difficulties that are arising in the prenatal clinic among the patients who are receiving instruction in the project on childbirth without fear.

Dr. Harlow D. Dunton, with the collaboration of Dr. Hilde Bruch, is continuing his investigation of five children (three to sixteen years of age) who have undergone corrective surgery for congenital atresia of the esophagus. Dr. Charles C. Hogan continues to evaluate neurotic and psychosomatic concomitants of thyroid and ulcer patients.

The teaching of psychosomatic medicine to the third-year medical students on the medical service has taken another step forward. This year, in order to make the classes smaller and thereby increase the amount of individual supervision of the clinical clerks taking this course, the classes were divided into three sections.

In addition to the above course, Dr. Kelley was asked to supervise a new teaching program in connection with the Departments of Dermatology, Otolaryngology, Orthopedic Surgery, and Surgery. This class meets one morning a week for three hours during the period that the clinical clerks are assigned to these specialties. We feel that the students have thus gained psychological insight into various diseases.

Dr. Sidney L. Horowitz of the Department of Dental and Oral Surgery again assisted Dr. Ruth Moulton with her course in psychosomatic dentistry. This course is given to undergraduate and postgraduate dental students.

Dr. Walter Stewart taught two courses in psychosomatic medicine to students in Physical and Occupational Therapy. He also gave two lectures on psychodynamics to the first-year students in the Correlation Clinic.

Dr. Millet was elected president of the New York Society for Clinical Psychiatry. He has also been made chairman of the Professional Advisory Committee of the Rockland County Mental Health Association. Dr. Millet read a paper on "Psychological Factors and Psychotherapy in Raynaud's Disease" at the American Psychosomatic Society meeting.

Dr. Ruth Moulton taught an extension course for psychologists, social workers and school teachers on the role of physical symptoms in mental illness at the William Alanson White Institute.

Dr. Bruch participated in a round table discussion on obesity at the American College of Physicians in Cleveland in April. She also gave a lecture entitled, "Limitations of Goals in Psychotherapy" for the Association for Psychoanalytic Medicine in January.

The International Universities Press has published *A Contribution to Psychotherapy with Schizophrenics,* written by Dr. Jacob Arlow. Dr. Arlow has continued as Corresponding Editor for the *Bulletin of the American Psychoanalytic Association.* He is also working as a collaborating author of the *Annual Survey of Psychoanalysis.* Dr. Arlow delivered a series of five lectures entitled "Psychoanalysis and Religion" at the New York Psychoanalytic Institute's School of Applied Psychoanalysis.

SCHOOL OF PUBLIC HEALTH

Professor Harold W. Brown, Associate Dean and Director

The faculty of the School of Public Health is reviewing the curriculum of the School in order to make changes which will bring it more in line with current practices and thinking in public health.

INSTITUTE OF ADMINISTRATIVE MEDICINE

Medical services in this country are undergoing a rapid evolution toward making available to the entire population modern, high-quality health services of every description. While it is not possible or necessary to predict the exact forms and methods of medical care in the future, there are certain well-defined indications of the direction in which health services are moving. These various trends point clearly to considerable modifications in the future of methods and plans of administering the facilities, personnel, and programs.

Broad problems must be evaluated and studied if hospitalization programs and adequate community-wide health services are to be carried out effectively. Some of these problems are the increasing age of the population, the vitalization and expansion of outpatient services, the more effective use of home medical care, the development of adequate laboratory, diagnostic, and therapeutic units, the recognition of necessary specialization and of the grouping of skills and talents of specialists into various forms of group practice, the rapidly developing trend toward prepayment insurance for medical and hospital expenses, the pronounced influence of preventive medicine by federal, state, and voluntary agencies, as well as those of the medical and dental professions, and the necessary training of competent personnel in all phases of hospital, medical, and public health programs.

In view of the needs and opportunities in broad field of administrative medicine, an Institute of Administrative Medicine has been established with the financial aid of the Josiah Macy, Jr. Foundation, and Dr. E. Dwight Barnett assumed the Directorship in January, 1952. The Institute of Administrative Medicine functions under a Coordinating Committee which comprises the executive officers of the various major medical and public health interests

represented in the program. Representatives of important outside interests such as the voluntary and municipal hospitals, the official and voluntary health agencies, and others directly concerned with the problems involved can readily be added to the coordinating group.

The Institute of Administrative Medicine is divided into five major fields of activity: hospital administrative, prepayment medical care, public health administration, industrial medical administration, and medical school administration.

A program of this scope and character under the auspices of the School of Public Health will make possible a comprehensive appraisal of the needs and problems of the hospitals, health services, medical care plans and industrial medicine, and public health administration. The program will make an important contribution to the development, utilization, and coordination of community-wide programs of hospital, medical, dental, nursing, and health services. The Institute will also afford opportunities for fundamental research in these fields and for the training of administrative personnel of the highest order.

Dr. E. Dwight Barnett, Director of the Institute of Administrative Medicine and Professor of Administrative Medicine, continues to serve as a member of the Blue Cross Commission of the American Hospital Association and also as a member of the Board of Trustees of the American Hospital Association. In February, Professor Barnett addressed the annual conference of Hospital-Physicians Relations personnel of the Blue Cross and Blue Shield Plans of the United States on the subject of "The Value of the Blue Cross-Blue Shield Physicians Relations in the Development of the Over-all Program for Prepayment of Medical Care in a Community." Professor Barnett gave a paper on "Third Party Payments" at the Institute for Hospital Administrators which was sponsored by the University of Minnesota. In May, Professor Barnett gave a paper on the "Community Relationships of Hospitals and Blue Cross Plans," sponsored by the Ohio Hospital Association and the Blue Cross Plans of Ohio. Professor Barnett also addressed the annual meeting of the Middle Atlantic Hospital Assembly meeting in Atlantic City on the subjects of "Coordination of Hospital and Public Health Services."

The Institute of Administrative Medicine sponsored an all-day conference on "Problems in Administrative Medicine" which was held at the McMillin Theater of Columbia University on May 15, 1952. Dr. Leonard J. Goldwater, Professor of Occupational Medicine of the School of Public Health, arranged the program, which included papers by the following: Dr. Willard C. Rappleye, Dean of the Faculty of Medicine of Columbia University; Dr. E. M. Bluestone, Consultant, Montefiore Hospital, New York, N.Y.; Dr. James P. Dixon, Commissioner of Health for City of Philadelphia; Mr. Winslow Carlton, Chairman of the Board of the Group Health Insurance,

Inc.; Dr. Leslie A. Falk, Area Medical Administrator, United Mine Workers of America, Welfare and Retirement Fund, Pittsburgh, Pennsylvania; Mr. Martin E. Segal of the Martin E. Segal Company, Consultants, Welfare Funds, Health and Pension Programs; Mr. William S. McNary, Vice-President and General Manager, Michigan Hospital Service and Chairman, National Blue Cross Commission, Detroit; and Professor Barnett.

The Division of Hospital Administration, now incorporated within Administrative Medicine, continues to have one of the most active programs in the School. To date 183 students have completed the work of this curriculum.

A two-day "Group Dynamics Program" was held at Arden House and the thirty students in hospital administration and a like number of nurses doing advanced work in nursing service administration at Teachers College participated in this conference.

The United States Public Health Service has established an orientation externship in hospital administration for students who have been accepted for the course in hospital administration at Columbia University.

DIVISION OF PUBLIC HEALTH PRACTICE

A search was made during the academic year for an individual to replace Dr. Harry S. Mustard as DeLamar Professor of Public Health Practice. The appointment is being made as of July 1, 1952 of Dr. William C. Spring, Jr. to this position. Dr. Spring comes to the School with an excellent clinical, research, and public health administration background. It is expected that under his direction the work in public health practice will be given new impetus. The School is planning to give a general course in administration for all students. Following this, students may specialize in administration of their various fields.

During the current year, the Division of Public Health Practice sponsored a number of forums in which the participants were outstanding individuals in various phases of public health and hospital administration. The guest speakers were as follows: Dr. Haven Emerson, Professor Emeritus of Public Health Practice of the School of Public Health; Dr. Justin M. Andrews, Scientist Director and Officer-in-charge of the Communicable Disease Center of the United States Public Health Service; Dr. Ray E. Trussell, Director of the Hunterdon Medical Center, Flemington, New Jersey; Dr. Fred L. Soper, Director of the Pan-American Sanitary Bureau; and Dr. L. L. Williams, Jr., Medical Director and Chief, Division of International Health of the United States Public Health Service.

DIVISION OF EPIDEMIOLOGY

The research project in the epidemiology of hypertension has continued through the year as a cooperative effort of the Division of Epidemiology of

the School of Public Health, the Bureau of Applied Social Research of Columbia University, and the Recess Commission on Hypertension of the Commonwealth of Massachusetts.

Professor E. Gurney Clark has continued participation in the research planning for the endemic syphillis and favus control program in Yogoslavia. He has completed the consulting work in epidemiologic aspects of untreated syphilis in Norway. Dr. Trygve Gjestland of Norway, who was in charge of the study, spent most of the school year at Columbia University analyzing material. Professor Clark has continued to serve as a member of the Subcommittee on Venereal Diseases of the National Research Council and has also been a special consultant to the Venereal Disease Division of the United States Public Health Service.

Mrs. Anna C. Gelman is continuing her participation in the studies of techniques for microbiological assay of vitamins in collaboration with Professor Maurice E. Shils. The following guest lecturers participated in the courses in epidemiology: Mr. Michael Bade, Chief, Division of Hospital and Institutional Inspection, New York City Department of Health; Dr. Ernest M. Gruenberg, Executive Director, State of New York Mental Health Commission; Dr. Robert H. Felix, Director, Institute of Mental Health, National Institutes of Health; Dr. Charles R. Rein, Associate Professor of Dermatology and Syphilology, New York University; Dr. Frank W. Reynolds, Medical Officer, Venereal Disease Section, United Nations World Health Organization; Dr. Guillermo E. Samame, Venereal Disease Section, United Nations World Health Organization, Regional Office of Americas; Dr. George M. Saunders, Medical Director, Socony Vacuum, New York; Dr. Jacques M. May, Medical Division, American Geographic Society; and Dr. Howard A. Schneider, Rockefeller Institute for Medical Research.

DIVISION OF OCCUPATIONAL MEDICINE

In view of the current developments in the field of occupational health, it was considered appropriate and desirable to change the name of the Division of Industrial Hygiene to that of Occupational Medicine. The term, "industrial hygiene," is now largely limited to engineering activities directed towards the elimination of industrial health hazards. "Occupational Medicine" has a much broader connotation, embracing all health and medical care problems of employed persons.

In the past several years there has been a progressive decrease in the number of qualified applicants for instruction in industrial hygiene, which has led to the decision to discontinue the special curricula for industrial hygiene engineers and chemists. At the same time, increasing emphasis has been given to training of physicians in the field of occupational medicine.

This change is in keeping with the program of the newly organized Institute of Administrative Medicine.

The research in occupational medicine has continued along two general lines: laboratory experiments on possible relationships between fatty changes in the liver and bone marrow and study of consumer reaction to prepaid comprehensive medical care.

Professor Leonard J. Goldwater has been appointed Consultant in Cardiac Rehabilitation to the Office of Vocational Rehabilitation of the Federal Security Agency. He also is serving on the Expert Advisory Panel on Social and Occupational Health of the World Organization. He accepted an invitation to undertake a consulting mission to Yugoslavia and Finland during the summer of 1952 and to confer with the Chief of the Section on Social and Occupational Health at Geneva, Switzerland.

Professor Irving R. Tabershaw presented a paper on the emotional factors and safety education at the New York State Medical Society Section on Industrial Hygiene in May, 1952 and a paper on mercurial nephrosis at the Atomic Energy Session at the meeting of the American Industrial Hygiene Association in Cincinnati.

Professor Maurice E. Shils has continued his research on the development of a simple and sensitive assay procedure for measuring vitamins and amino acids. Several investigators from the United States and from Peru have studied this technique in Professor Shils' laboratory to ascertain its usefulness as a field method for assessing nutritional status.

Professor Shils has received a grant from the National Vitamin Foundation to study the effects in various experimental animals of diets analagous to those causing Kwashiorkor and related diseases in man. This group of diseases exists on a world-wide scale and has been characterized recently by the World Health Organization as one of the most widespread and important nutritional diseases in the world. This project is designed to obtain fundamental knowledge on some nutritional, biochemical, and pathological relationships. Professor Wellington B. Stewart of the Department of Pathology is collaborating in this study. Professor Shils is cooperating with the Department of Surgery and the Institute of Cancer Research in a study on the vitamins in various organs and tissues and in certain tumors.

Doctor John B. Waterlow of the Human Nutrition Unit of the Medical Research Council of Great Britain addressed a meeting sponsored jointly by the School of Public Health and the Department of Pediatrics. His topic was "Kwashiorkor and Nutritional Liver Disease in Man."

Professor Norman Jolliffe visited Brazil and gave lectures on nutrition in several medical institutions. The New York City Nutrition Clinic at the Washington Heights District Health Center, of which Professor Jolliffe is the Chief, has inaugurated an obesity clinic. This is one of the first public

health clinics of its kind and studies are being made on the various causes of obesity and methods of prevention.

DIVISION OF PARASITOLOGY

The number of graduate students majoring in parasitology during the present year has been unusually large. There are ten students registered for the Master of Science degree in parasitology and two students who will receive the Doctor of Public Health degree. Mrs. Helen S. Wells was granted a Doctor of Philosophy degree in the field of parasitology in February, 1952.

Professor Harold W. Brown and Dr. Kathleen L. Hussey are continuing their studies on the chemotherapy of enterobiasis. Mrs. Helen S. Wells, a graduate student, found that certain antibiotics are very effective against pinworm in mice and clinical studies have shown that terramycin is extremely effective against pinworm in man. Dr. Kam-Fai Chan and Dr. Kuo-Yeng N. Hsieh, candidates for the Doctor of Public Health degree, have continued their studies on the life cycle of the two pinworms of mice and have also made extensive studies on their chemotherapy. Arrangements have been made with a number of pharmaceutical companies to furnish new compounds to be assayed against these infections.

Professor Brown has continued his study of filariasis. He is following the course of a number of patients whom he treated for *Wuchereria bancrofti* infections nine years ago. He is also continuing his studies on the effect of heavy metal compounds against caine filariasis.

Professor Brown and Dr. Hussey have continued to test new drugs developed by Abbott, Lilly, Sharp and Dohme, and the Upjohn pharmaceutical companies against *Endamoeba histolytica.* These researches are directed toward the finding of a more effective chemotherapeutic agent against amebiasis than is now available. The pharmaceutical companies support this work.

Professor Roger W. Williams completed investigations on the influence of antibiotics and vitamins of the B complex upon the growth and development of mosquitoes.

Doctor Hussey spent the summer of 1951 at the University of Michigan Biological Station where she and Professor Lyell J. Thomas of the University of Illinois are working on the life cycle of cestode parasites of birds. This work is being supported by a grant from the United States Public Health Service.

Professor Brown served as consultant to the Chancellor of the University of Puerto Rico in connection with its medical school. He also participated in seminars for the Florida State Board of Health. He arranged a conference on the use of antibiotics in tropical diseases for the New York Academy of

Sciences. The papers presented at this conference will be published in book form.

The Division of Parasitology has continued to do parasitic diagnostic work for the whole Medical Center. The number of examinations requested has increased greatly during the past few years and the number of parasitic infections that are detected is suprisingly large.

DIVISION OF PUBLIC HEALTH EDUCATION

Dr. George Rosen assumed the position of Professor of Public Health Education in July, 1951, and during the past year the curriculum in public health education has been revised and expanded to include the newer developments in the field of public health as well as in related areas.

In the course of the academic year each student has been required to work in some official or voluntary health agency in the City of New York in order to acquire an initial background of experience to be used in class seminars and as an introduction to the three months' field training taken by all students after they have completed their academic studies.

Among the persons who have participated in the teaching program during the year as guest lecturers were the following: Dr. Granville W. Larimore, Director of the Office of Public Health Education of the New York State Department of Health; Dr. Herbert G. Birch, Assistant Professor of Psychology in the College of the City of New York; Mrs. Sallie E. Bright, Executive Director of the National Publicity Council; Mr. Ralph T. Fisher, Director of the Division of Health Education of the New Jersey State Department of Health; Mr. Solomon S. Lifson of the American Heart Association; Mr. George Nelbach of the State Charities Aid Association; Mr. M. J. Plishner, Chief of Veterans' Service of the National Tuberculosis and Health Association; Dr. Henry C. Sandler, Chief of the Dental Division of the Brooklyn Veterans Administration Hospital; and Mr. Irving S. Shapiro of the Division of Health Education of the Health Insurance Plan of Greater New York.

DIVISION OF BIOSTATISTICS

As in past years, the Division has had a number of students specializing in this curriculum. Five students were registered for the Master's degree and there were an additional six part-time special students.

During the year Professor John W. Fertig gave a series of lectures in research methods to the Department of Physiology of New York University College of Dentistry. Professor Fertig continued to work with Dr. Neal W. Chilton of the New Jersey State Department of Health on the adaptation of certain statistical techniques to dental research problems. This work has been sponsored by the United States Navy. Certain phases of this study were

reported at the meeting of the Statistics and Dental Health Sections at the annual convention of the American Public Health Association. Professor Fertig is participating with Professor Morton M. Kligerman of the Department of Radiology in the design of experiments on radiation sickness.

The Division of Biostatistics has given frequent advice and consultation on research problems in the Medical School. Professor Fertig has served as a consultant to a number of research activities of the New York City and New York City and New York State Health Departments. He has given statistical advice to a committee of the New York Academy of Medicine which is studying neo-natal deaths, to a committee of the Family Health Maintenance Demonstration which is being sponsored by the Community Service Society and Montefiore Hospital, and to the Engineering Committee of the American Public Health Association. Professor Fertig is also a member of the Committee on Lipoproteins and Atherosclerosis of the National Heart Institute and a statistical consultant for the Sidney Hillman Health Center.

DIVISION OF SANITARY SCIENCE

The curriculum in sanitary science leading to the Master of Science degree was inaugurated in 1949–1950 and was given on a limited, trial basis in that year and in 1950–1951. During 1951–1952 it became a full-fledged program with nine full-time and several special students.

A program of supervised, summer field training as a requirement for this degree was instituted in June, 1952. This has been developed in cooperation with the Training Division of the Communicable Disease Center of the United States Public Health Service, through its training center at Amherst, Massachusetts.

Provision was developed for the first time for advanced studies in the health and disease aspects of irrigation. A sanitary engineer candidate for the Master of Public Health degree majored in this specialty and prepared a thesis on this subject.

Professor Alvin R. Jacobson served the Health Department of the Virgin Islands for a three month period in the summer of 1951 on a sanitary survey of St. Croix and St. Thomas, including systematic harbor pollution studies.

During the summer of 1951, Professor John M. Henderson visited Venezuela as a member of a mission engaged by the National Ministry of Health to review the public health program and problems of that country and to prepare a long-range program and plan of reorganization. Offsite studies were continued throughout the year and a revisit is scheduled for the summer of 1952. The mission's report is to be completed at that time.

Consequent to his visit as Consultant and Visiting Lecturer to the Schools of Public Health in Brazil, Argentina, and Chile in the summer of 1950,

Professor Henderson has been elected to honorary memberships in the Asociacion Argentina de Higiene and the Centro Agentino de Ingenieros. He has continued service as a member of the Tropical Medicine Study Section of the National Institutes of Health, as a National Research Council subcommittee member, and as Special Consultant to the Communicable Disease Center of the United States Public Health Service.

Laboratory research of the Division was concerned mainly with special studies on the sanitary chemistry of fluoride ions in drinking water supplies.

DEPARTMENT OF RADIOLOGY

Professor Ross Golden, Executive Officer

The resignations of several members of the Department of Radiology have been accepted with great regret during the past few months. Dr. Ernest H. Wood, Associate Professor of Radiology, who has been chief of the neurological division of our Service, resigned as of May thirty-first to become Professor of Radiology and Executive Officer of the department at the new medical school of the University of North Carolina. Dr. Vincent P. Collins, Associate Professor of Radiology and chief of the radiotherapy division at the Francis Delafield Hospital, left on June first to become Professor of Radiology and Executive Officer of the department at Baylor University School of Medicine. With particular regret the resignation of Dr. Lois Cowan Collins is recorded. Now Associate Professor of Radiology, she has been a member of our staff for ten years and has shown unusual ability in clinical radiology, in teaching, and in administration. She will join her husband, Professor Vincent P. Collins, in Houston after July first. The resignations of four Instructors in Radiology have been received with regret, Dr. John L. Williams in February, and Drs. Myer Sharpe and Frank Remy in May. They will undertake the private practice of radiology. Dr. Charles A. Bream resigned as of June thirtieth to become Assistant Professor of Radiology under the direction of Dr. Ernest H. Wood at the University of North Carolina. Dr. Franklin Reed, was appointed Instructor in Radiology as of June first and Dr. Catherine J. Dalton and F. Mitchell Cummins as of July first.

The demand for special training in the Department of Radiology outside the regular resident staff of twelve has been steadily increasing and we have had an unusually large number of such trainees in the past months. Among them, besides the five clinical fellows who were already with us last year, have been Dr. Kent Ellis who was on a National Cancer Institute Fellowship until January, 1952, when he was appointed a regular resident in radiology; Dr. Flora Kaplan from Montefiore Hospital; Dr. Joseph R. Galluccio who, after finishing training in radiotherapy at the Francis Delafield Hospital,

spent some time on our Service for further work in diagnostic radiology before going into private practice; and Dr. Francisco Torres-Leon of Colombia, S.A. Dr. Jose Villela Pedras of Rio de Janeiro began one year in radiotherapy on June first and on July first five new clinical fellows will begin their training.

In addition, there have recently been many requests from undergraduate medical students who wish to take radiology as their elective. Since January the third floor X-ray division has had nineteen such students observing the routine work for a period of one month each.

This year the Wednesday radiological conferences have dealt principally with discussions of bone and of the gastrointestinal tract. Some were given by members of our own Department and we have been fortunate enough to have had interesting and stimulating talks by visitors such as Dr. Joseph Nahon of the Fort Hamilton Veterans Administration Hospital, Dr. Raymond Lewis of the Hospital for Special Surgery, and Dr. Isidore Snapper, Professor of Medicine and Director of Research at Mount Sinai Hospital. Our own fracture service has again been most cooperative in giving several talks on bones, and Dr. George A. Hyman from the Department of Medicine spoke on radiation effects on blood. Mr. Dale Trout of the General Electric Company presented an investigation of methods to reduce the amount of X ray received by the patient during diagnostic procedures.

The experimental X-ray machine for studies on animals and cadavers which was so badly needed and which was finally ordered last year, thanks to a generous gift from the Damon Runyon Memorial Fund and an anonymous donor, has now been installed in the College and is ready for use by the various medical school departments which will find need of it.

The designers and builders of the Howard V. Long rotation therapy unit which was installed one year ago, presented the Department with a new table which, when attached to the machine, permits horizontal rotation of the patient. This increases the usefulness of the unit.

In July, 1951, the Atomic Energy Commission granted authorization to Professor Morton M. Kligerman and Professor Sidney C. Werner of the Department of Medicine for the use of radioactive gold in the treatment of carcinomatosis of the pleura or peritoneal cavity and for ascites and pleural effusion in patients with non-malignant conditions.

Professor Kligerman recently became a member of the Committee on Research, Council on Pharmacy and Chemistry, Subcommittee on Steroids and Cancer of the American Medical Association.

In the radiotherapy division studies on methods of practical dosage calculation in radium and X-ray therapy have been carried out by three physicists under the direction of Professors Kligerman and Edith H. Quimby. Two papers based on this work were presented at the meeting of the Ameri-

can Radium Society in June by Miss Jeanne Richmond and Mrs. Victoria de Castro.

Other research projects under way include an investigation of the use of Dramamine and Pyridine in radiation sickness which will be carried out in a statistically controlled clinical experiment; a study by Professors Jacox and Wells on late radiation effects with follow-up of five years or more on patients given over 500r; a survey by Professor Wells and Dr. Norah Duvernet Tapley of one year's gastrointestinal examinations to determine the percentage in which no significant evidence of disease was demonstrable, the cause of gastrointestinal bleeding, the incidence of ulcer, cancers, and of errors in diagnosis; a survey of one thousand newborn skulls by Professor John Caffey of the Department of Pediatrics and Dr. Andrew P. Dedick; a survey of Dr. Solomon Schwartz of gastric ulcer and carcinoma cases over a period of five years for the evaluation of differential diagnosis of gastric ulcer; an evaluation of the accuracy of the diagnosis of superficial spreading carcinoma by X-ray methods, using benign ulcers as a control, also by Dr. Schwartz; and an investigation of the efficiency of the exsufflator, or coughing machine, using anesthetized dogs with mucin thorotrast mixtures and foreign bodies placed in the major bronchi, being carried out by Professor Alvan L. Barach and Dr. Gustav J. Beck of the Department of Medicine and Dr. Anthony R. Galgano.

As usual the members of the staff have been occupied with outside activities as well as with their duties in the Hospital and the College. Professor Ross Golden was invited by the Kansas City Southwest Clinical Society to present three papers on the gastrointestinal tract at their meeting in October. He was also guest speaker on a radio program organized by that Society for the purpose of giving the general public an opportunity to hear certain facts concerning carcinoma of the stomach. In February Professor Golden was Visiting Chief Pro Tem for one week at the Atlantic City Hospital. During that time he gave five lectures on the small intestine, the stomach and the Miller-Abbott tube. Also while in Atlantic City he was a member of a panel of the American College of Surgeons, for the discussion of bleeding from the gastrointestinal tract. At the Stated Meeting of the New York Academy of Medicine in March he spoke on "What is New in X-ray Diagnosis." During April he visited the new University of California at Los Angeles Medical School at the invitation of the Professor of Radiology, Dr. Andrew H. Dowdy, for conferences on the equipment and organization of the Radiological Department and took part in the program of a postgraduate course in radiology. He spoke to the staff of the Veterans Administration Hospital at Long Beach, California, on small bowel physiology. This lecture was repeated to the staff of the Veterans Administration Hospital in the Bronx, in May. On May 26th Professor Golden gave the Carman Lecture of the Minnesota State Medical

Society in Minneapolis. The next day he spoke to the third-year medical students of the University of Minnesota.

Professor Golden was elected Honorary Member of the Deutsche Rontgen-Gesellschaft and of the Radiological Section of the Royal Society of Medicine, London. He was also elected Fellow of the New York Academy of Science. He was appointed Delegate to the Seventh International Congress of Radiology (Denmark, 1953) from the American College of Radiology; is Chairman of the Delegation from the United States to this Congress; and is Delegate to the Fourth Inter-American Congress of Radiology (Mexico City, 1952) from the same Society. He continues to act as Chairman of the Committee on Foreign Affairs of the American College of Radiology, as Chairman of the Committee on Medical Education of the New York Academy of Medicine and as a member of the American Board of Radiology. He also continues as Area Consultant in Radiology for the Veterans Administration and in that capacity he made a tour of inspection of three Veterans Administration Hospitals in up-state New York during the month of May.

Professor Caffey gave the Cowie Memorial Lecture at the University of Michigan entitled, "Some Normal Variants in the Growing Skelton and Their Significance in Roentgen Diagnosis." He presented papers before medical groups in Wisconsin and Texas, and took part in a Symposium on Pediatric Diagnosis at the American Academy of Pediatrics in Toronto. An article on gargolyism was published by him in the *Bulletin of the Hospital for Joint Diseases* in October.

In addition to his usual teaching schedule, Professor Jacox gave a series of five weekly lectures on "Radiation Therapy in Dermatology" to the Department of Dermatology and lectured to the students in the Department of Nursing on the "Fundamentals of Radiotherapy." In April he gave a postgraduate course to the dentists of the New Jersey State Department of Health and the New Jersey State Dental Society. This lecture, "Radiotherapy of Head and Neck Tumors," was accompanied by a demonstration and tour of the radiotherapy division. The same course was repeated for a similar group in May. Professor Jacox was appointed by the United States Army Medical Corps to act as consultant to the Armed Forces Institute of Pathology in Washington from October 22 to 27, and presented two papers entitled "Radiation Effects in Cancer of the Breast" and "Radioactive Isotopes for Therapy." He gave a refresher course at the meeting of the Radiological Society in Chicago, a lecture on recent advances in radiotherapy at the New York Veterans' Administration Office and presented a paper on "The Effect of Irradiation upon Cancer" at the Radiological Research Seminar. He was elected Secretary of the New York Roentgen Society, and Vice-Chairman of the Section of Radiology, Medical Society of the State of New York.

The Skull and Brain Roentgenologically Considered by Professor Lois C. Collins and Charles W. Schwartz was brought out in December, 1951, by the Charles C. Thomas Publishing Company. Professor Collins, with Dr. Dedick, presented a paper on bleeding from the small intestine before the American Roentgen Ray Society in Washington in September. At the same meeting Professor Collins gave a refresher course on small intestinal physiology and Dr. Gerhart S. Schwarz presented an exhibit on "Roentgen-ray Penumbra and Depth Dose Distribution." In May, at the request of the Academy of Medicine at Northern New Jersey, Professor Collins read a paper on "Roentgenologic Problems in the Stomach and Small Intestine."

Professor Kligerman read several papers to medical groups and societies, among them "Segmental Resection and Radium Implantation in the Treatment of Carcinoma of the Bladder" (co-authors, Dr. John N. Robinson, Dr. George Fish, and Isabel David); "Useful Techniques in Rotation Therapy Applicable to Standard Deep Therapy Machines" at the Eastern Conference of Radiology; "Use of ACTH in Radiation Fibrosis" at the meeting of the New York Roentgen Society; "Rotation Techniques" at the New York-Cornell Hospital; and he gave two lectures at Temple University Hospital in Philadelphia.

Dr. Pablo L. Morales read a paper on the effect of cortisone on the skin erythema reaction of low kilovoltage radiation, before the New York Roentgen Society. A paper on "Post-Traumatic Leptomeningeal Cysts with Erosion of the Skull" by Drs. Juan Taveras and Joseph Ransohoff was presented in January before the New York Society of Neurosurgery. Dr. Julian Mandell gave a paper for the New York Roentgen Society in May entitled "The Correlation of Electrical Activity with Motor Behavior in the Small Intestine." This work on the basic physiology of the small intestine of animals, in collaboration with Professor Duncan A. Holaday of the Department of Anesthesiology and Dr. Herbert Volk of the Department of Surgery, is being continued in the laboratory of the Department of Radiology. In October an article entitled "Use of ACTH and Cortisone in the Treatment of Post-irradiation Pulmonary Reaction" by Professor Kligerman and Dr. Stuart W. Cosgriff of the Department of Medicine, was published. "A New Rotation Roentgen Therapy Unit" by Professor Kligerman and Mr. Henry Schaefer was published in the *American Journal of Roentgenology, Radio-Therapy and Nuclear Medicine.*

The work of the Radiological Research Laboratory has proceded along the lines described in previous reports. There are two major divisions, the research project for the Atomic Energy Commission, and problems allied with therapeutic radiology and with medical uses of radioactive isotopes. The new quarters in the cancer research laboratories on the eleventh floor of the

College have permitted reasonable expansion of both of these divisions. They have also made possible the permenent setting-up of certain facilities which are very valuable in carrying out the work of the laboratory.

Professor G. Failla's time during the past year, as in the previous year, has been devoted largely to directing the work of the Atomic Energy Commission project, and to his duties as consultant to the Atomic Energy Commission and the Armed Forces Special Weapons Project. He has continued to be active in various committees dealing with protection of personnel from ionizing radiations, radiological instrumentation, and medical applications of radioactive isotopes. The research problems under investigation on the project are described in the Annual Report submitted to the Atomic Energy Commission.

Professor Edith H. Quimby's time has continued to be divided between teaching and clinical research problem in connection with X rays, radium, and radioactive isotopes. In addition to her regular courses in the Medical School, she and Mr. Carl Braestrup gave a course in radiological physics in the Department of Physics on the campus. Also under her direction the residents and fellows in the Department receive individual training in radioisotope techniques during their final year. Professor Quimby has also served as consultant or committee member of various organizations, including the Atomic Energy Commission and the National Research Council.

Professor Roberts Rugh has been principally occupied with the general supervision of the radio-biological research on the Atomic Energy Commission project. He has also supervised a project for the Academy of Pediatrics and the work for the thesis of John Geary who took his Ph.D. in Biophysics in the spring of 1952.

Professor Harald H. Rossi has conducted and supervised research in the measurement of neutron doses and allied problems in the Atomic Energy Commission project. He is also supervising the work of two graduate students in the Radiological Research Laboratory for the degree of Ph.D. in Biophysics.

Professors Failla and Quimby continue to be members of the Sub-Committee of the Joint Committee on Graduate Instruction for work in biophysics. All of the professorial members of the staff have offered courses for study in this field. All of them have also been actively participating in projects for civilian defense, being especially concerned with problems dealing with radiation safety.

All the isotope projects listed in the last report have been continued. Clinical use of radioiodine, radiophosphorus and radiogold have been standardized and put on a self-supporting basis. Various research projects are going on in cooperation with the Departments of Medicine, Surgery, Anesthesiology, and Pathology.

Within the past year the Atomic Energy Commission has offered to

selected institutions a "general authorization for the use of radioactive isotopes in human beings." In such institutions, projects for the use of these substances are not subject to review by the Sub-Committee on Human Applications of the Committtee on Use of Radioactive Isotopes. Instead the necessary review is done by a committee within the institution. The Columbia-Presbyterian Medical Center has such an authorization and Professor Failla is the Chairman of the institutional Isotope Committee. Professor Quimby is also a member.

Professors Failla, Quimby, Rugh, and Rossi have all appeared on the programs of national and local radiological, medical, physical, and other societies and have given a number of lectures to medical and lay audiences. Many of these lectures were on topics connected with the application of atomic energy in biology and medicine. In February Professor Quimby was awarded the Jagadish Bose Memorial gold medal of the Indian Radiological Association. Her paper (delivered in absentia) was entitled "Recent Developments in Radiation Dosimetry." In June Professor Quimby was elected President of the American Radium Society at their meeting in Chicago.

Several papers have been published during the year by members of the laboratory staff and several others are awaiting completion.

DEPARTMENT OF SURGERY

Professor George H. Humphreys II, Executive Officer

The prolonged readjustment period which began with reorganization of the residency training program and professional staff assignments immediately after the war, and which has continued through an extensive physical revision and rearrangement of clinical and laboratory facilities throughout the last four years, this year reached its final phase. Last year the surgical out-patient clinics moved from the third to the tenth floor of Vanderbilt Clinic and this year have functioned smoothly in their new quarters, hampered only by continued shortages of personnel. The new operating rooms of the eighteenth floor, which reopened in the Spring of 1951, have gained in effectiveness during this year as personnel needs were filled during the last Summer and Fall. The Babies Hospital operating rooms reopened in December and the endoscopic facilities on the eleventh floor opened in February, both freeing additional space on the eighteenth floor for our increasing clinical needs. In the Medical School the laboratories of surgical pathology and cell physiology moved into their new quarters on the fourteenth floor in the Institute of Cancer Research last Spring and have functioned at a high level of activity from the start. New laboratories were set up this year on the twelfth and fifteenth floors of the Institute for other re-

search activities in this Department related to cancer. Finally, the remaining research laboratories of the Department were moved to new quarters on the sixteenth and seventeenth floors in the Medical School in January, 1952.

Dislocations inherent in moving and reorganizing so many research laboratories inevitably lead to disruption of function. Much time necessarily was spent by many members of the staff in the administrative and physical details of moving, and smooth continuity of research activity was, in consequence, hampered. In setting up the new laboratories with improved equipment and facilities, the University has been most generous and understanding of our needs. In coordinating the moves and providing as far as possible for the individual requirements of our many workers Professor David V. Habif has accomplished a Herculean task with a minimum of confusion and discord.

With somewhat less than we would like in solid research accomplishment behind us this year, then, we are ready to go forward more effectively than ever on a broad program. This program includes surgical pathology, cell physiology, a variety of approaches to cancer research, surgical bacteriology, biochemical studies of metabolic responses to operation, physiologic studies of normal and diseased states of the stomach, small bowel and colon, and studies of circulatory dynamics in response to anesthesia and operation in general, and in particular to procedures designed to alter abnormal cardiovascular conditions. In addition, the program includes animal operation facilities for the teaching of undergraduate and graduate courses in our own and other departments, as well as for research involving recovery experiments on dogs aimed toward developing new techniques in human surgery.

This broad field of research activity is vital to the Department, in contributing directly to scientific knowledge. It also imparts to the medical students, through daily contact with men actively engaged in research, an appreciation not only of the clinical and technical aspects of surgery but also of some of the possible means of approaching problems still unsolved. In this way some may be stimulated toward academic work. In particular, men receiving graduate surgical training on the resident staff or as fellows, are thus afforded opportunities to undertake investigative work and encouraged to pursue an academic career.

The increasing research activity of the Department has developed in large part from the presence of an active nucleus of "strict full-time" staff members. This year, however, it has been found impossible to continue the support of these members of the staff on an adequate basis. In the coming year, therefore, it has been found expedient to modify our full-time system to one of "geographic full-time" for those clinical members formerly dependent entirely on salary. Only the Executive Officer and the staff members who do not

operate will remain on "strict full-time," It is to be hoped that this is a temporary expedient.

There have been a few changes in staff this past year. On June 30, 1951, Dr. Henry T. Randall, whose outstanding work in the surgical metabolism laboratory has been mentioned in previous reports, resigned in order to accept the post of Clinical Director of Memorial Hospital. On the same date, Dr. John Pool resigned. He had come to us in order to strengthen the group of surgeons working in both Presbyterian and Francis Delafield Hospital in the field of neoplasms of the head and neck, while retaining his position on the staff of Memorial Hospital.

On May 7, 1951, Professor Bruce M. Hogg was granted a leave of absence for one year and in May of this year resigned in order to enter practice in Miami where he is continuing his interest in pediatric surgery. Dr. Mark K. Wang who had been awarded an American Cancer Society fellowship following completion of his residency in plastic surgery the year before resigned on August thirty-first to practice exclusively in plastic surgery in Albany. During the year four members of the assistant resident staff were called for military service.

On August first Dr. Enzo Krahl was appointed Research Fellow and has worked in association with Professor Arthur H. Blakemore and Dr. Hugh F. Fitzpatrick until June thirtieth. On July first Dr. John Pickren was appointed Instructor in Surgery. Dr. Itaru Ohara came to us on September seventeenth on an Army fellowship from Japan and has been associated with Prof. Ralph A. Deterling, Jr. in cardiovascular research. Dr. Gabriel Godman began on October first as a Dazian fellow in surgical pathology. Dr. Godman will continue next year in immediate charge of the laboratory of histochemistry which is being set up in the Institute of Cancer Research under the guidance of Professor Raffaele Lattes. Dr. Jean Paul Lintilhac was with us as a Fulbright Fellow in plastic surgery from April twentieth to August twenty-fifth.

The various surgical laboratories newly established in the Institute of Cancer Research have been reported more fully in the annual report of the Institute. In the largest unit, surgical pathology, the number of specimens studied again exceeded seven thousand. In addition to carrying the responsibility for this work and conducting regular courses for graduates, residents and medical students, Professor Lattes and Virginia K. Frantz and Dr. Pickren have continued their studies on exfoliative cytology. Professor Lattes has also continued his participation, in association with Professors Edward L. Howes and Charles A. Ragan, Jr., in the experimental studies on the effects of cortisone on connective tissue reactions. Professor Frantz has continued her clinical and experimental studies on thyroid cancer, and is pre-

paring a fascicle on islet cell tumors of the pancreas for the *Tumor Atlas* of the Armed Forces Institute of Pathology.

Professor Margaret R. Murray and her associates have continued studies of a variety of human neoplasms in tissue culture and have initiated in vitro studies of agents modifying growth in normal and neoplastic tissue. The bibliography of tissue culture research which has been compiled by Miss Gertrude Kopech in this laboratory is now nearing completion.

Professor Cushman D. Haagensen, in association with Professor Michael Heidelberger and Professor Dan H. Moore of the Department of Anatomy, has continued work on the milk factor of mammary carcinoma in mice. A year's leave of absence from clinical duties was granted Professor Haagensen on January first in order to complete his book on the treatment of human mammary carcinoma. At the same time he resigned his position as Chairman of the Coordinating Committee of the Institute of Cancer Research but remains coordinator of cancer teaching, in which capacity he has played a large part in arranging intensive postgraduate courses at the Francis Delafield Hospital, as well as a number of seminars here and in other cities. Under Professor Haagensen's supervision, Mrs. Edith Cooley has continued her valuable statistical investigation of neoplastic disease at the Medical Center.

Professor Howes and Dr. Charles W. Findlay, Jr., have continued their studies on the influence of altered metabolism on the proliferation of normal and neoplastic cells. Professor Howes has continued his work with Professor John D. MacLennan of the Department of Bacteriology on the development of bacterial enzymes of use in debriding devitalized tissue, especially in burns. This study has now advanced to the state of clinical evaluation.

In August a new laboratory was set up under the immediate direction of Dr. Daniel Shapiro, who was granted a year's leave of absence from the assistant residency on a Dazian Fellowship in order to initiate a study of combinations of agents in cancer chemotherapy. The work of this laboratory is coordinated with studies being conducted by Professor Maurice E. Shils in the School of Public Health on differences in vitamin patterns of tumor and normal host tissues.

The work begun last year by Dr. Randall in the metabolism laboratory was continued under Professor Habif's direction. Previous work on electrolyte shifts in body fluids in relation to operation and various diseased states were supplemented by studies of total body water distribution by means of deuterium. Professor Habif has also completed, with two members of the resident staff, Drs. Alfred Jaretzki and Alfredo Rehbein, a study of the effectiveness of a new anticoagulant drug on three hundred patients, as well as clinical studies on the evaluation of radioactive gold therapy in conjunction with the Department of Radiology and of the effects of hyaluronidase in relieving lymphedema.

Miss Balbina Johnson has broadened her field of study of antibiotic agents in various infections. A major project has been a joint clinical and laboratory study of the response of infections to terramycin therapy. With Dr. Paul Teng, she has studied specific effects of Polymyxin B. With Professor Edmund P. Fowler, Jr. of the Department of Otolaryngology and Professor J. Lowry Miller of the Department of Dermatology she has cooperated in evaluating antibiotic therapy of infections of special interests to those departments. With Professor Frank Meleney a study has been carried out of the effects of various antibiotics given by mouth, either singly or in combination, on intestinal organisms in preparation for colon surgery. In addition, further studies on bacitracin have been continued. All bacteriologic, diagnostic, and sensitivity tests for the surgical services have been carried out in her laboratory.

In the field of gastro-intestinal physiology, Dr. Robert B. Hiatt and his associates have continued their work on ulcerative colitis. The source of the excess lysozyme in the colon of these patients has been determined and its possible effect on the pathogenicity of certain organisms is being studied. In collaboration with the Department of Pharmacology they have studied the sensitivity of intestinal smooth muscle in normal controls and in patients with ulcerative colitis and congenital megacolon to the effects of acetylcholine and choline esterase blocking agents. Dr. Jose M. Ferrer, Jr. has studied the effects of tropine benzohydryl ether sulfonate in blocking various intestinal symptoms due to overactivity of the parasympathetic nervous system. Dr. Edmund N. Goodman's work on the electrogastrogram has entered a new phase with the improvement of the recording apparatus with the help of an engineer, Mr. George M. Katz. Dr. Herbert Volk has continued his studies on electrical activity of the small intestine in animals in conjunction with the Department of Radiology. Dr. Robert Grinnell has continued his painstaking studies of the spread of metastases from cancer of the large intestine.

Disturbances of cardivascular physiology have been studied by a variety of new approaches. Under the direction of Professor Blakemore and Professor Emanuel M. Papper of the Department of Anesthesiology, Drs. Fitzpatrick and Krahl have recorded directly simultaneous pressures in peripheral arteries and cardiac chambers or in arteries, venae cavae, and portal veins in patients during anesthesia and operation for cardivascular disease. In addition, they have carried out continuous regional heparin therapy in over 100 cases, and have carried out experiments designed to determine hepatic flow and flow through surgical portocaval shunts both clinically and in the laboratory in association with Professor Stanley E. Bradley of the Department of Medicine. Dr. Samuel Powers has perfected his method for determination of cardiac output which has been checked against studies carried out simultaneously in the cardio-respiratory physiology laboratory of the Department of Medi-

cine. Working together, Drs. Powers and Fitzpatrick have studied by their techniques in the animal laboratory the effects of acute hemorrhage and methods of blood replacement, and the relationships of vascular occlusion to blood flow, both in the terminal aorta and in the coronary arteries.

In the animal laboratory Professor Ferdinand F. McAllister has continued his studies of Back's method of revascularization of the heart following coronary occlusion. Professor Ralph A. Deterling, Jr., in association with Drs. Mary Parshley, Itaru Ohara and Shivaji Bhonslay, has continued his extensive studies on venous and arterial grafts and their preservation. Five preserved human aortic grafts were used by him during the year with success. Under the guidance of Professors Blakemore and Thomas W. Stevenson, Jr., Dr. David Ju has begun a promising study of lympathic circulation in the normal and lymph-edematous state with the use of radioactive iodine bound to albumin. Over six hundred animal operations were carried out.

Under the direction of Professor John Scudder, the blood bank and associated research laboratories have had a year of extraordinary activity. New discoveries of rare sub-types of sera have been made in our bank and correlated with those made elsewhere, with the result that many cross-matching and other tests must be done in order to forestall sensitization of patients and untoward reactions. At the same time greater use of blood fractions has added new means of combating blood disturbances and at the same time has posed new problems demanding attention. The magnitude of the work in the bank is indicated by the fact that over 13,000 transfusions were given during the year, and over 114,000 tests carried out. The increasing complexity of the problem of compatibility has led to new interest in the use of material other than blood to combat shock. In this connection Professor Scudder has been engaged, in cooperation with the Department of Obstetrics and Gynecology, in a study of a promising material called "PVP." At the same time he has acted as technical advisor for a teaching film on the same material.

Our teaching program has this year been through a period of transition. The third-year clerkship has been eliminated, and under the guidance of Professor Henry S. F. Cooper a new program of coordinated basic teaching in association with the Departments of Orthopedic Surgery and Anesthesiology has been set up. At the same time we have inaugurated an experimental study of objective methods of examination in conjunction with a simultaneous move in the field by the National Board of Medical Examiners. This program is under the guidance of the Educational Testing Service at Princeton which was visited by the surgical committee of the National Board, of which Professor George H. Humphreys, is a member.

The Department has been increasingly active in the Francis Delafield Hospital, where, under Professor Joseph J. McDonald's leadership, Professor Haagensen and Dr. Milton R. Porter have taken the lead in inaugurating an

elective course for undergraduates as well as intensive teaching exercises in the graduate field. As clinical activity increases it is becoming evident that this new unit will become one of the outstanding institutions in this country for research and teaching in the field of neoplastic disease and a most valuable addition to the resources of the Department and the University. At the same time the resources at the Mary Imogene Bassett Hospital in Cooperstown, and at the Roosevelt and St. Luke's Hospitals in New York have been augmented by building programs which will add substantially to the clinical material available there. At Bellevue Hospital the program continues with little change.

Members of the Department have continued to be very active in attending meetings and symposia in other cities in this country and abroad. Approximately 100 papers were read and 36 papers were published by 30 members of the Department. Dr. Con Amore Burt received first honors for his paper given at the American Proctological Society in Atlantic City in June, 1951.

On April twenty-sixth Professor Jerome P. Webster was given an honorary degree in medicine and surgery by the University of Bologna, Italy. Professor Webster was honored by the University for his achievements in the fields of plastic surgery and the history of medicine, and especially for the book, *The Life and Times of Gaspare Tagaliacozzi, Surgeon of Bologna* which he wrote together with Mrs. Martha Teach Gnudi, his assistant. This biography of the sixteenth century surgeon and author of the first book ever produced on plastic surgery was published in 1950.

DEPARTMENT OF UROLOGY

Professor George F. Cahill, Executive Officer

The Department reports that the undergraduate teaching has functioned within the restricted schedule established in 1949. A thesis-report type of examination has been continued as a means to assure reading and interest in some part of urology. The theses as a rule have been very well done.

There have been few changes in the staff. Dr. John K. Lattimer has been promoted from Associate to Assistant Professor of Clinical Urology. There have been no resignations from the staff.

During the year Dr. Harry Seneca has been active in further work upon in vitro biosynthesis of cortisone from desoxycorticosterone and other steroids by the adrenal cortex. He also has studied the maintenance and purification of *E. histolytica* cultures in cellophane sacs. The bactericidal properties of certain iodine compounds and H. S. or "di-isobutyl phenoxy ethoxy ethyl dimenthyl benzyl ammonium chloride monohydrate" has been studied on bacteria, especially those producing genitourinary infections. A study has

been done upon the effect of various steroids on pregnancy in the rat. The following steroids have been used: testosterone, estradiol benzoate, estradiol dipropionate, cortisone, ACTH, progesterone, postassium estrone sulfate, stigmasterol, saponin, and hyaluronidase. Studies were made upon the effect of sperm of the rat upon the ovum in cellophane sac culture and the maintenance of the fertilized ovum in the cultures. During the year Dr. Seneca wrote chapters for Pullen's *Communicable Diseases* and in Gradwohl's *Clinical Tropical Medicine.*

The Francis Delafield Hospital unit under Professor Perry B. Hudson has coordinated the laboratories in the new unit on the fifteenth floor of the Medical School for cancer research in urology. One of the problems under study has been to determine the value of bilateral adrenalectomy upon advanced cancer of the breast and reactivated cancer of the prostate. Studies upon the incidence of prostatic cancer in the general population have been given by Professor Hudson at cancer conferences in Cincinnati and in Orlando, Florida. With Drs. Alex L. Finkle and Robert S. Totten, Professor Hudson has been studying the grouping of prostatic cancers. Dr. Totten and Professor Arthur Purdy Stout of the Department of Pathology have been arranging the diagnostic criteria for microscopic detection of prostatic cancer. Professor John M. Reiner has been studying the synthetic enzyme systems in prostatic tissue. This work, supported by a grant to Professors Hudson and Reiner by the National Cancer Institute of the United States Public Health Service, will publish its first report, a study of the effects of aging upon the changes in synthetic enzyme activity in the tissues of the urinary tract, in *Cancer Research.* During the year a vascular perfusion machine designed to keep whole human organs alive for protracted periods of time has been designed, constructed, and is being utilized for the studies upon the testis and kidney. For more than a year Dr. Morris London has been experimenting upon the resolving and purifying of the principle acid phosphatase enzyme which is contained in prostatic tissue. The chemical nature and enzyme kinetics of the acid phosphatase enzymes have been under study by Professors Hudson and Reiner and Dr. Kenneth Tsuboi.

Professor George W. Fish began the study of the effect of massive doses of estrogens upon advanced prostatic cancer and he was joined by Professor Hudson and Dr. Harold W. Jost. A report is being made of the results. In collaboration with Professor Frederick J. Agate, Jr. of the Department of Anatomy and Professor Alfred Gellhorn of the Department of Medicine, Professor Hudson has studied the ascorbic acid and cholesterol content of the normal human adrenal gland under different conditions of stimulation by anterior pituitary proteins and conditions of repression such as the administration of cortisone. Collaboration with Professor Stanley E. Bradley of the Department of Medicine, upon renal function and water metabolism studies

were made during the year. Doctor Meir Podberezec, Fellow in Urology, has been actively studying the observations upon adrenalectomized patients. He has also been investigating the effects of total blood replacement in animals on the enzymatic syntheses of various organs as an indication of aging.

Professor Hudson and others are cooperating with Professor Seymour Lieberman of the Department of Obstetrics and Gynecology in the study of the pattern of urinary steroid excretion in the adrenalectomized human, with the identification of cortisone metabolytes and those of other administered steroids. The use of supravoltage X-ray therapy upon primary bladder tumors has been systematized in the Francis Delafield Hospital by Professor Hudson with Professors Vincent P. Collins and Maurice Lenz of the Department of Radiology. Dr. Finkle again received the first award for research by residents given by the New York Urological Society and was given honorable mention at the Annual Meeting of the American Urological Society at Atlantic City. During the year Professor Hudson and Dr. Finkle presented papers upon prostatic cancer to the Section of Pathology in the New York Academy of Medicine.

Professor Reiner has been continuing the experimental investigation of enzyme control mechanisms, particularly the adaptive enzyme systems of single cells. With Professor Hudson he has been interested in the inhibition of certain of the synthetic enzyme reactions in mammalian tissue and has been recently joined by Dr. Marian Bentley in these studies. Dr. Menard M. Gertler of the Department of Medicine has been the principle investigator with Dr. Jost and Professor Hudson in studying the serum lipids of patients in various endocrine states. Professor Hudson and Dr. Finkle have devised a system of regional block anesthesia for perineal prostatic surgery and have been in collaboration with Dr. Jean Henley of the Department of Anesthesiology in its use and in its improvements.

Professor Lattimer has continued to conduct the research unit for kidney tuberculosis in a pilot study of the new drug, "isonyazid." Its usefulness, limitation, and toxicity have been investigated at the request of the Veterans Administration and the Pure Food and Drug Administration. A study of streptomycin and PAS in a large number of genitourinary tubercular cases was made, and the proof was made of the value and the method of application of these drugs, as well as the demonstration of advances in life expectancy. These studies were presented at the Annual Meeting of the American Medical Association in Chicago, at the United States Government Conference on chemotherapy of tuberculosis at St. Louis, at the American Urological Association Meeting at Atlantic City, at the New England Section of Urology, Baltimore Urological Society, Stanford University, and at the California Tuberculosis Association Annual Meeting in San Francisco. Professor Lattimer has studied and improved the technique of radical retropubic

prostatectomy for cancer of the prostate, and has made a color motion picture of this technique which was exhibited at the American Urological Association Meeting. He also made another motion film on the technique of partial nephrectomy of renal tuberculosis, an operation only practical with the concurrent use of the new anti-tuberculosis drugs. This film was shown at Stanford University and also at the American Urological Meeting. A moving picture film was also made demonstrating the Veenema-Gusberg biopsy instrument for the early diagnosis of cancer of the prostate. The demonstration of the use of the instrument was by Dr. Ralph Veenema, a Resident in Urology.

Professor Meyer M. Melicow while in Europe in August and September, 1951 presented a paper on "Tumors of the Adrenal Gland" before the University and the Local Medical Society in Jerusalem. He also presented a study of tumors of the testes in Jerusalem and Tel Aviv. He also participated in the Paris meeting of the International College of Surgeons. Professor Melicow and Dr. J. Hollowell have completed a study upon intra-urothelial cancer and it is in process of publication. Professor Melicow also has presented a study of secondary tumors of the testis among which were three cases of multiple myeloma. He has also undertaken a study of the chromosome content of tumors of the testis and hopes to determine if there is a difference between seminoma and the embryo-tetratoid group of tumors, and thus aid their classification and clarify their origins. Professor Melicow was present as participator in various discussions of urological pathology during the year. With Dr. F. H. Redewill he presented a paper on Malakoplakia of the urinary bladder at the American Medical Association Meeting. He also delivered the results of a study of 2,500 specimens and biopsies of bladder tumors in a paper read at the Annual Meeting of the American Urological Association. At present in association with Dr. W. J. Nelson he is carrying out a study of occult carcinoma of the prostate and with Dr. Jack M. Waldrep a study of adenocarcinoma involving the bladder.

During the year, Professor John N. Robinson was made Consultant in Urology to the West Point Military Academy. He also has continued his work as Chief Consultant in Urology in the Veterans Administration in Washington. He has been President of the New York Urological Association for the past year and Dr. Charles T. Hazzard has been Treasurer.

Professor Fish has served as an official representative of the American Urological Association in a tour of inspection of Japanese Universities, medical schools, and hospitals, and served as Consultant to the Army in Japan and Korea. He also has contributed the chapter on "Surgery of the Bladder" in Campbell's new *System of Urology*.

Dr. Ralph C. Yeaw has served as Chairman of the Genito-Urinary Section

of the New York Academy of Medicine and has been elected Treasurer of the New York Urological Society.

Professor George F. Cahill completed his five-year service as a member of the Special Advisory Committee to the Administrator of Veterans Affairs. He continued his services as Vice-President and Trustee of the American Board of Urology, and as Governor of the American College of Surgeons. During the year 1952 he was elected President of the American Urological Association. He also has been made Trustee of the Research Foundation of the American Urological Association.

Numerous papers have been presented by staff members before local, state, and national societies. Professor Robinson was co-reporter with Professor Fish, Professor Morton M. Kligerman and Dr. Isabel Davis of the Department of Radiology in a study upon segmental resection and radium implantation in carcinoma of the urinary bladder. Professor Cahill has presented a number of papers upon various pathological conditions of the adrenal and their correction. Several of these have been in association with Professor Joseph W. Jailer of the Department of Medicine with studies of the effect of ACTH and cortisone upon the adrenogenital syndrome in children.

MEDICAL LIBRARY

Professor Thomas P. Fleming, Medical Librarian

With medical literature growing at an exponential rate, the relatively stationary budget of the Medical Library is seriously hampering the research programs at the Medical Center. In the last report it was noted that the percentage of requests for current literature that we were able to supply was decreasing to the point where we could accommodate only two-thirds of the requests. Despite the fact that funds are extremely limited in one way or another, our list of journals currently received increased from roughly 1,900 to approximately 2,100, despite the fact that we cancelled a total of some seventy titles which were taken elsewhere in the Medical Center or in the University.

One factor which makes it so expensive to operate this Library is that the Medical Center has no publication of its own with which to exchange with other institutions for their publications. As a consequence we must pay for practically every one of the more than 2,000 journals which we receive. It is particularly gratifying to report, therefore, that the Editorship of the *Journal of Clinical Investigation* has come home again for some twelve years' absence. Under the aegis of the late Dr. Randolph West we had an arrangement whereby in return for the Library's verification of the accuracy of the biblio-

graphical citations in accepted papers for the *Journal,* the Library would receive gratis all copies of journals received by the *Journal of Clinical Investigation* in exchange. Professor Stanley E. Bradley of the Department of Medicine, the new Editor, has renewed this mutually beneficial arrangement.

The Bibliographic Service, that of supplying investigators with references to current literature on a topic under investigation, went on a partially self-sustaining basis this year. With the inauguration of a service charge, the number of participants dropped sharply, as was to be expected. Some twenty-five subjects were followed in contrast to 100 the previous year.

Close relationship has been established with the Francis Delafield Hospital Library. More than a thousand volumes of journals from 1926 on have been deposited in that library for use there. These represent additional copies of material in the Medical Library.

Among the many and valued gifts received during the year were a volume of manuscript notes by Peter D. Vroom of the lectures of David Hosack, Professor of Practice of Physics at the College during the sessions 1924–1926. This notebook will be of value to historians seeking to determine and evaluate the status of medical education in the United States in the first quarter of the twentieth century. It was presented by Mr. W. P. Banning of Maywood, New Jersey, through Professor Dana W. Atchley of the Department of Medicine.

Professor Jerome P. Webster of the Department of Surgery continued to support the Library of Plastic Surgery, contributing $1,500 toward its maintenance in the past year.

It is with a sense of deep loss that we report the resignation of Dorothy L. Goodenow, Chief Cataloger. In her twenty-two years of service in the Library she has seen the collection grow from an initial 50,000 volumes to more than 175,000. The loss of her knowledge of medical literature will be keenly felt by staff and clientele alike. During the year Erich Meyerhoff and Claire Hegele were appointed Senior Reference Assistants.

During the year the Librarian and his associates gave a total of forty-two hours of formal lectures on the use of the literature in the various specialities in addition to fourteen hours of group orientation in the use of the Library. This represents a slight increase over similar activities of the year before and is in sharp contrast to the total of two hours of instruction given fifteen years ago.

COLUMBIA UNIVERSITY
BULLETIN OF INFORMATION

Fifty-third Series, No. 44 November 14, 1953

Report of the Dean of the Faculty of Medicine

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1953

COLUMBIA-PRESBYTERIAN MEDICAL CENTER
168TH STREET AND BROADWAY
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Columbia University Bulletin of Information

Fifty-third Series, No. 44 November 14, 1953

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The series includes the Report of the President to the Trustees and the Announcements of the several Colleges and Schools relating to the work of the next year. These are made as accurate as possible, but the right is reserved to make changes in detail as circumstances require. The current number of any of these Announcements may be obtained from the Office of the Secretary, 213 Low Memorial Library.

C. U. P. 2,100—1953

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FACULTY OF MEDICINE

REPORT OF THE DEAN

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1953

The registration of the School of Medicine was as follows:

First year	120
Second year	117
Third year	114
Fourth year	116
TOTAL	467

Residents from 45 states, totaling 1,572 students from 264 colleges, applied for admission to the first-year class entering in September, 1953. The 120 accepted students received their liberal arts education in 39 different colleges and came from 23 states.

In view of some criticism of admission policies of medical schools, it seems appropriate to repeat statements regarding the selection of students at this institution which have been published in past years.

The Committee on Admissions deserves great credit for the thoroughness with which they select our students. We have had an unusual record for the past few years of an almost unanimous promotion record each year. The Committee continues to place great emphasis in the selection of students on factors other than grades, although candidates must give evidence that they are able to carry the academic program.

In the selection of students preference is given to those who have shown, in the opinion of the Committee on Admissions, high achievement in their college education, a mature sense of values and sound motivation, qualities of leadership, willingness, and ability to assume responsibility, and who, therefore, have already given evidence that they are likely to succeed in medicine.

The importance of a broad liberal education cannot be overemphasized. The practice of medicine is both a science and an art—to treat the patient as a whole man, the doctor must be a whole man himself. Students planning a career in medicine should be motivated toward becoming leaders in medical thinking, rather than technicians, because medical

practice is both a private enterprise and a public responsibility. The liberal arts college offers the opportunity to prepare for a fuller and more useful life of citizenship. Years of specialization may lie ahead in a professional career, but the foundation of all advanced study is a broad liberal education.

The wide distribution of the applicants for admission and the acceptances are illustrated in the following figures:

Area	*Applicants*	*Acceptances*
New York City	577	52
New York State (exclusive of New York City)	177	12
Other states or territories	777	54
Foreign	41	2
TOTAL	1,572	120

The registration of the Dental School was as follows:

First year	41
Second year	38
Third year	36
Fourth year	35
TOTAL	150

During the year, there were 81 students registered for noncredit postgraduate courses in the Dental School and 46 students registered for postgraduate credit courses. A class of 27 students was enrolled in Dental Hygiene and 14 received the degree of Bachelor of Science.

In the School of Public Health the registration was as follows:

D.P.H. candidates	3
M.P.H. candidates	27
M.S. candidates	65
TOTAL	95

The registration in the School of Nursing was as follows:

First year	123
Second year	95
Third year	100
TOTAL	318

During the past year there were 752 students from 21 affiliated schools of nursing who received instruction under the Department of Nursing in various hospital and laboratory units of the Medical Center.

In the Course for Occupational Therapists 45 students were registered; 53 students were registered in the Course for Physical Therapists.

The following degrees were awarded during the year:

M.D.	116
Med.Sc.D.	1
D.D.S.	35
M.P.H.	22
M.S. (Public Health fields)	65
B.S. (Nursing, Occupational Therapy, Physical Therapy, Dental Hygiene)	105

In addition to the students enrolled under the Faculty of Medicine there were 83 students registered under the Graduate Faculties of the University who took courses and advanced research work in the departments of the Medical School.

It is evident from the preceding figures that the Faculty of Medicine is responsible for the instruction of many more students, graduate and undergraduate, than is commonly understood. The total of medical, graduate, postgraduate, nursing, occupational therapy, physical therapy, dental, dental hygiene, and public health students, visiting scholars, fellows, hospital residents, and younger staff members runs to over 3,000 full-time and part-time students.

It is gratifying to report that during the academic year 74 of the medical students received scholarships averaging about $395 per student.

The Janeway Prize, awarded to the graduate who, in the opinion of the Faculty, has ranked highest in efficiency and ability, was given to Carl M. Barlow. The Borden Undergraduate Research Award was given to Jay I. Meltzer for outstanding research work during the medical course. The Dr. William Perry Watson Prize in Pediatrics was awarded to Garrison Rapmund. The Prize for Excellence in Pedodontics, awarded by the Class of 1929, was given to Stanley R. Sadles. The Van Woert Scholarship Award and the Alpha Omega Prize were awarded to Murray Schwartz. The Ella Marie Ewell Medal in Dentistry was given to Pandelis Camesas. James R. McCartney, Class of 1955, was given the Frederick P. Gay Memorial Award. Mr. Joseph A. Randi received the

Rowe-Wiberg Medal, the Sigma Epsilon Delta Award, and the Prize for Excellence in Operative Dentistry.

It is with the greatest sorrow that we report the following deaths during the year:

Edwin H. L. Corwin, Associate Professor of Public Health Practice, on May 8, 1953
Bernhard Dattner, Assistant Clinical Professor of Neurology, on August 11, 1952
William Harris, Clinical Professor of Radiology (Mt. Sinai), on April 7, 1953
Edson B. Heck, Instructor in Medicine, on September 25, 1952
Frederick B. Humphreys, Associate Professor of Bacteriology, Retired, on June 30, 1952
Adrian V. S. Lambert, Clinical Professor Emeritus of Surgery, on October 15, 1953
Heyman R. Miller, Lecturer in Medicine, on August 23, 1952
Howard C. Moloy, Assistant Clinical Professor of Obstetrics and Gynecology, on March 13, 1953
Earle B. Phelps, Professor Emeritus of Sanitary Science, on May 29, 1953

The following designations were made during the year:

Goodman L. Foster, Acting Executive Officer of the Department of Biochemistry, from June 15 to September 30, 1952
Eleanor Lee, Acting Executive Officer of the Department of Nursing, for 1953–1954

The following retirements will become effective June 30, 1953:

Henry W. Cave, Clinical Professor of Surgery (Roosevelt Hospital)
Bion R. East, Professor of Dental Public Health Practice
Edward P. Eglee, Clinical Professor of Medicine (Bellevue Hospital), Visiting Physician, First Division, Chest Service, Bellevue Hospital
Hubert S. Howe, Clinical Professor of Neurology
William F. MacFee, Clinical Professor of Surgery (St. Luke's)
William B. Parsons, Professor of Clinical Surgery
Henry A. Riley, Professor of Clinical Neurology
Howard F. Shattuck, Clinical Professor of Medicine (Roosevelt Hospital)

The following emeritus designations, effective July 1, 1953, were made by the Trustees:

Bion R. East, Professor Emeritus of Public Health Practice
William B. Parsons, Professor Emeritus of Clinical Surgery
Henry A. Riley, Professor Emeritus of Clinical Neurology

The following changes of title were made:

Alvan L. Barach, Clinical Professor of Medicine, from July 1, 1952
Neal W. Chilton, Assistant Professor of Dental Public Health Practice, from July 1, 1952
William S. Langford, Professor of Psychiatry, from July 1, 1953
Dan H. Moore, Associate Professor of Microbiology, from July 1, 1953
Max Pleasure, Associate Clinical Professor of Dentistry, from September 1, 1952
Melvin B. Watkins, Assistant Professor of Clinical Orthopedic Surgery, from July 1, 1952

Among the promotions made during the year were those of:

Mary E. Callahan, Assistant Professor and Director of Training for Physical Therapists, from September 1, 1952
Robert E. Herlands, Associate Professor of Dentistry, from September 1, 1952
Clinton van Zandt Hawn, Associate Professor of Pathology (Mary Imogene Bassett Hospital), from November 1, 1952
Charles A. Perera, Associate Clinical Professor of Ophthalmology, from January 1, 1953

Effective July 1, 1953, the following promotions were made:

Edward A. Cain, Associate Professor of Dentistry
Morton M. Kligerman, Associate Professor of Radiology
Margaret R. Murray LeDoux, Associate Professor of Anatomy
Charles A. Noback, Associate Professor of Anatomy
Solomon N. Rosenstein, Professor of Dentistry
Roger W. Williams, Associate Professor of Entomology

During the year the following new appointments were made:

Leon Dmochowski, Visiting Associate Professor of Microbiology, from February 1, 1953
Alan F. Guttmacher, Clinical Professor of Obstetrics and Gynecology, from January 1, 1953
Ernest B. Reeve, Visiting Professor of Physiology, from January 1, 1953

THE GRADUATE AND POSTGRADUATE PROGRAM

There continued to be a decrease in the enrollment in postgraduate courses. During the year, there were 485 physicians enrolled in 50 such continuation courses. Many course offerings have been omitted and a few new ones added in an effort to keep the program realistic and useful.

Much of the demand for postgraduate training after World War II was temporary. Whether there will be a moderate increase in the demand again when medical veterans of the Korean episode are released remains to be seen. It is believed that our program offers to medical officers returning from service with the armed forces a very significant opportunity to review various aspects of clinical medicine and, consequently, facilitate their return to civilian practice.

The formal course offerings do not reflect the full extent of the Faculty's interest in postgraduate medical education. Members of our staff are participating constantly in programs sponsored by medical and scientific organizations throughout the country. Sixty-seven visiting scholars from 31 foreign countries came to the Medical Center during the year for periods up to a full year of study.

Forty-four residents in affiliated hospitals were given formal basic science courses. This is in addition to the usual opportunities made available to residents in the Medical Center to participate in educational and research activities at the College.

STUDENT HEALTH SERVICE

The Student Health Service, under the faithful direction of Dr. Albert R. Lamb, Jr., continues to meet the health needs of the students and employees of the Faculty of Medicine.

During the past year there were 402 routine physical examinations on students and 218 pre-employment physical examinations on new employees. Fifteen students were admitted to the admitting ward and 31 to the Hospital. Routine chest X rays and routine dental examinations, including X rays, are available to the student body.

In the past year Hospital Unit records on all students currently under the supervision of the Health Service were prepared. In these records, the previously separate Student Health records are incorporated for the first time. The desirable accomplishment of bringing together all medical records of each individual to one place is realized.

Besides providing routine health service, the Student Health Service continues to help students in other ways, such as rendering premarital examinations, completing insurance forms, and offering other similar service.

NEW CHALLENGES TO MEDICAL EDUCATION

The year 1953 marks the twenty-fifth anniversary of the opening of the Columbia-Presbyterian Medical Center. On this occasion it would seem appropriate to discuss a few of the problems associated with the maintenance of adequate standards of medical education and practice to which the Medical Center was dedicated. The past quarter-century has demonstrated amply the vision and wisdom of the Hospital and the University in creating a real center of medical teaching and research, which, as promised, has provided the highest quality of patient care and community service. The program was visualized and consummated as a noteworthy contribution to a remarkable era in the evolution of professional education in this country. It is well to recall briefly the efforts in that period because, as it has been aptly said, "those who cannot remember the past are condemned to repeat it."

The first decade of this century saw the struggle of the universities, the state governments, and the profession to establish adequate standards of medical education, licensure, and practice. In this fifth decade we are confronted with the challenge of maintaining the standards that have been developed during the last forty years.

The reform in medical education in the United States began just before 1900, following the lengthening of the medical course to four years by Harvard University in 1892 and the founding of the medical school of Johns Hopkins University in 1893. The graded curriculum for medical instruction was adopted generally in 1899, and the first nationwide report on the medical schools was published by the American Medical Association in 1900. The Council on Medical Education was created in 1904. In 1906 there were 160 medical schools in the United States, representing about one-half of the total number of such institutions in the world at that time.

By 1909 most of the leading schools had established the four-year medical course, which was made a prerequisite for approval by the AMA Council in that year. By 1918 eighty-one of the ninety medical schools had adopted the requirement of two or more years of college preparation for admission. It was during the period from 1906 to 1918 that the proprietary medical schools were largely eliminated.

THE SIGNIFICANCE OF ADEQUATE HEALTH SERVICES

It is a truism that the health of the population is highly prized in all civilized societies and is probably the greatest single asset of any nation. In the past a healthy constitution was believed to have been a gift bestowed upon a favored few by the inscrutable gods. More recently, the possession of good health has been attributed to inheritance or luck or to a combination of both. Today, however, the advances in science are making it possible in increasing measure to preserve normal health and promise to bring better health to the people of the world. This great hope can be fulfilled, however, only if the leaders in medicine, education, and the community have the wisdom to develop proper facilities, effective administrative and financial procedures, and, above all, competent personnel at all levels.

The necessity of maintaining and improving professional competence requires special emphasis at this time, when educational standards are threatened by the demands for increased numbers of physicians and other professional workers without commensurate increases in the resources to insure the continuance of high standards. Achieving an appropriate balance between quantity and quality in a period of unparalleled scientific advance and in the face of increasingly popular demands that all the people should have the benefits of modern research and medical care is probably the most difficult and urgent problem confronting the medical and allied professions today.

Incomplete as the knowledge regarding the diagnosis, treatment, and prevention of diseases and the maintenance of normal health is, it is far in advance of the application of that knowledge to the needs of individuals, families, or communities. There is a great lag between that which we know and that which we apply.

It is a challenge to our professions, institutions, industries, and government to coordinate their efforts in formulating ways and means by which sound, progressive programs can be provided. It would be more than unwise to ignore the broad obligations of medicine, which must be recognized as a social as well as a biological science. It must be recognized also that the individual himself is responsible for assuming a vitally important role in maintaining the health of his family and himself.

The provision for adequate health services must be practical and at-

tainable rather than purely theoretical. It is possible to visualize a comprehensive, complete supervision over the health needs of everyone that would be unnecessary and extravagantly expensive, even with the high level of expenditures in all forms of daily life to which we have become accustomed in this country. It is simply not necessary that every service be made available to every individual. We must have an attainable goal in which the exercise of judgment on the part of competent and trained physicians is of the highest importance. It is a selectivity of services and the judgment of well-qualified and honest physicians that should be the objective.

The complexity of present-day living in a modern industrial society has had its severe impact on the earlier simple relationship between physicians and patients. Nevertheless, the needs in matters of health, sickness, and disability are still individual and personal. Factors which have had an influence on the changes include, among others, the industrialization of our country; the high rate of urbanization; new methods of communication and transportation; the conduct of government largely by pressure groups; the increasing age of the population; the necessity for competent laboratory diagnosis and therapeutic services for every area; the recognition of specialization and the coordination of skills and talents into various forms of group practice for patients who need such multilateral attention; the rapidly developing trend toward prepayment insurance for medical, hospital, and other services; the increasing contribution to preventive medicine by federal, state, and voluntary agencies, as well as by the professions; the financial difficulties of hospitals in an inflationary economy; and the maintenance of proper physician-patient-hospital relationships. The over-all problem is to devise ways and means to provide and integrate the required facilities, qualified personnel, and necessary financial support in order to apply present and new knowledge to the needs of patients and communities.

CONTRIBUTIONS OF THE FACULTY

The Faculty of Medicine has long been aware and has contributed materially to the advance of our concept of the integration of sound medical training through the interpretation of social, psychological, emotional, and economic factors in the care, treatment, and study of patients. The teaching programs of the University in the undergraduate,

graduate, and postgraduate training of physicians have never lost sight of the patient as the unit of medical care.

Nearly fifty years ago the social-service department, perhaps the first of its kind in this country, was introduced, and has continued to play an important role in the care and treatment of patients, as well as in the educational program. The routine follow-up clinic, set up in 1915, and the unit history system were established in recognition of the "longitudinal" study of patients as distinguished from the purely cross-section method of observation, so common in teaching clinics elsewhere.

The study of stress as a factor in health and disease and the development of the "personality panel" by Professor George Draper thirty years ago indicate the early recognition by the Faculty of these important concepts. The increase of psychiatric teaching on all of the wards in the hospitals and in student clerkships points clearly to an endeavor to understand the total individual and the relationships between psychological and emotional factors and their influence on bodily function. These activities have been emphasized in all of our instructional programs by the importance attached to the necessity of a complete and discerning history of each patient.

The social, economic, and psychological factors have a well-recognized impact on the health conditions of many individuals, but everyone is subject to this same impact. The real problem lies in the manner in which an individual adapts himself to the various conditions of stress and strain to which he may be subject in his daily life. The interpretation of the response of the individual to his environment is far more important than the enumeration or even the study of the psychological and emotional factors themselves.

Seven years ago the group clinic was established for the fourth year of teaching. It operates throughout the twelve months of the calendar year, as does the third-year instruction. The concept of group practice has made it possible to bring the highest type of integrated instruction to bear upon the actual care of patients. The College has taken an active leadership in the study of various chronic diseases both at the Medical Center and through its affiliation with the Goldwater Memorial Hospital. The opportunities for experience in the highest type of rural practice at the Mary Imogene Bassett Hospital, in Cooperstown, and the instruction in industrial medicine, nursing procedures, and public health are other illustrations of the broad concept of the teaching program.

These contributions are only a few of the indications of the long-standing awareness on the part of our Faculty of the broadening responsibilities of medical care, the necessity of adapting modern quantitative and technical advances to the needs of patients, and the equipping of physicians to carry out modern medical services in our present-day society.

NECESSITY FOR COMPETENT PERSONNEL

Inasmuch as the level of any health service program cannot rise above the competence of those who participate in it, the recruitment and proper education of professional personnel are essential to the future of medical and health services. Proper education is for the needs of the future, not the past or the present. Of one thing we can be sure; there will always be change. Furthermore, the educational program itself is not designed to render professional or community services, as many people seem to think, but to educate individuals to perform those services competently.

In view of the impact of the many social and economic factors upon medical and health care, some people advocate a radical revision of the basic philosophy of medical education by shifting the emphasis to social and economic aspects. These aspects are important features of health services and, hence, of professional education, but they must supplement, not substitute the necessary fundamental training in the basic sciences upon which scientific knowledge is founded and the future of medical progress, medical care, and public service must depend.

The enthusiastic advocates of many of the proposed changes in medical education, which some describe as unique and progressive, sometime overlook the fact that merely doing something differently is not necessarily doing it better. Increasingly the discussion on changes in curriculum with the attempt to focus on teaching by the faculty rather than learning by the student is growing. Real education at the professional level is largely self-education with emphasis on the importance of learning by doing under supervision and establishing sound methods and habits of study, which will equip the student to continue his own development throughout his professional career. Many of the newer proposals are merely modifications of previous devices for spoon feeding and a spoon-fed correlation of instructional material. There is no short cut to learning on the part of the student because many of the features of medical practice, science, and community service cannot themselves be taught, they have to be learned.

Although there should be a full appreciation of the many new emphases in science and medical practice, it is important that medical education be neither diluted nor diverted from the meticulous, accurate training of physicians, which has been the foundation of progress in medical education in this country during the last forty years.

PREPAYMENT MEDICAL CARE

The rapid development of prepayment hospital programs and, more recently, prepayment medical-care plans sponsored by labor unions, either independently or jointly with industry, and numerous other consumer groups indicates a new development in American medicine that has assumed major proportions. The medical profession itself independently sponsors a variety of programs for partial coverage. At the present time over 86,000,000 persons in the United States have protection of varying degrees against hospital and medical expenses. The number has increased by about 70,000,000 in the last ten years. Some of these plans are attached to pension contracts and often do not provide complete coverage. Many of the schemes suggest the possibility of a later need for governmental or other forms of assistance.

The American people are convinced of the value of adequate medical services and demand that benefits of high quality be made available to the entire population. Medical security in some form is coming, and it is up to our profession to draft sound progressive plans. Our American institutions, such as universities, medical schools, hospitals, clinics, and professional organizations which enter into this effort, justify their existence in the long run by the extent to which they serve the public interest. Conversely, there is an obligation on the part of the individual himself as well as the public to insure through private, philanthropic, voluntary, and even governmental assistance, if proper safeguards can be found, that an adequate number of well-trained and competent physicians, nurses, dentists, and public-health officers is recruited, educated, and placed satisfactorily in our social and economic pattern of life.

SICKNESS INSURANCE

Much is being said these days about various forms of sickness insurance. This term is a misnomer because most discussions on this topic deal only with economic or financial aspects. Real sickness insurance is guar-

anteeing as far as humanly possible that physicians, dentists, nurses, public health officers, and others are adequately trained and competent to perform modern, up-to-date health services for the individual patient and the community. Hence, real insurance investment should be in adequate and competent personnel, the only sound and reasonable protection for the future medical care of the American people. Nothing would be more misleading than to believe that adequate financing *per se* will guarantee proper health services in the future. Adequate support of medical education and research must be the key.

SUPPLY OF PHYSICIANS

It is disappointing, indeed, to hear some, who should be informed, advocate increasing the enrollment and accelerating the instruction of existing medical schools, which already are operating with greater than capacity enrollment and, as in our own school, through twelve months of the year, without safeguards for the maintenance of proper standards of training. The suggestions are based on the general theory that an overproduction of physicians would force surplus doctors into areas where physicians appear to be needed. No one disputes the fact that there are sections of the country which have a shortage of health personnel. This is particularly true of smaller communities. However, this problem is more a matter of distribution than total numbers. There are also well-recognized shortages of medical and other workers in certain specialties of medicine, dentistry, nursing, and public health.

The situation has been made worse by the demands of national defense, governmental agencies, and industry as well as of the public for more medical and health services. The problem cannot be solved both quickly and wisely, but the fact is that the medical schools of the country are trying to meet the situation. As an illustration, during the last decade the enrollment in medical schools has risen 22.8 per cent while the population has increased 16.4 per cent. During the next ten years the output of physicians should rise another 25 per cent.

Last year the additions to the profession in this country totalled 6,885. The number of deaths reported was 3,829. This leaves a net increase in the number of physicians of 3,056. Everyone familiar with the problems of the medical schools is aware of the overenrollment, the dilution of standards, and the many difficulties which the medical schools face, not

the least of which is insufficient financial support for maintaining, improving, and expanding facilities for medical education and research, which are so essential to the progress of American medicine.

FOREIGN GRADUATES

While every effort is being made to retain as fully as possible the level of medical education and practice that has been developed during the last forty years, there are now additional features that enter into the struggle to maintain standards. The large number of physicians seeking admission from foreign countries is one of these problems. The most recently published reports state that one-seventh of the internships and residencies of the approved hospitals in the United States is filled by aliens. Unpublished reports indicate that the ratio may now be close to one in four. For example, approximately 48 per cent of all internships and residencies of the hospitals in New Jersey are filled by aliens. Although it is no reflection whatsoever on individuals or their earnest efforts to obtain a professional education, a great many from foreign countries are graduates of institutions which do not provide the quality of instruction required of American schools. The situation represents a new phenomenon in American medicine which has a direct bearing on the maintenance of the standards of medical practice throughout the country.

THE BRYDGES ACT

At the present time there are approximately 1,700 approved internships and 3,940 approved residencies in the State of New York. In view of the fact that about one-sixth of the approved internships and approximately one-fifth of all of the residencies in the United States are in New York State, a recent action by its legislature is of national as well as of local significance. As of July 1, 1953, the educational requirements for internship, which have been a part of the present State education law for many years although not enforced, will be repealed. A new law will permit all hospitals to appoint interns without regard to their educational qualifications and many hospitals to appoint residents under the same condition. The State intends to solve the problems of staffing the hospitals by abdicating essential standards which it had adopted in the past. Some of the extravagant statements and dire predictions by the advocates of legal recognition of lower standards merely reflect their unwillingness or in-

ability to come to grips with this vital question. There are approximately 1,000 graduates from unapproved medical schools now serving in the hospitals of the State of New York. The employment of hospital staffs which do not meet the professional requirements recognized throughout the country, and even perhaps by the courts of the State, may introduce a number of interesting and serious consequences to the hospitals that employ such staffs should those institutions be sued for malpractice or damages.

Those who have advocated and secured the passage of legislation specifically repealing the qualifications for internship and weakening those of residency training have done so on the allegation that by so doing the hospitals of the State would be made available for the education of foreign physicians. Reference is made to the desire to "equalize the educacation of the foreign graduate" and capitalize on his broad interest in "postgraduate medical education." It is difficult, however, to understand how it is possible to compensate for the inadequate preparation of many of these graduates from medical schools which are below acceptable standards by placing them in "postgraduate training" in hospitals that provide practically no training program.

It is all too obvious that the device is essentially a method of securing house staffs for hospitals that are not otherwise able to attract graduates of approved schools. It is equally clear that there is no intention to conduct these internships on an educational basis. Some other term should be used for the employment of these individuals than "interns" or "residents."

In the United States the internship has come to be accepted universally as an essential part of the preparation of the physician. It is a requirement for licensure in no less than twenty-seven states and most territories. The residency plan has been accepted everywhere as the basis of true graduate medical training. To use these two important designations, which are accepted generally as a part of the educational pattern of American medicine, as a lure for the recruitment of large numbers of untrained or incompetent individuals is likely to discredit the entire effort to maintain professional standards in this country.

Those who sponsored the legislation in New York maintain that the standards are not lowered. It seems to be evident now that the standards are not reduced they are merely eliminated. A recent announcement of

the new program states that it will permit "interns who are generally under close supervision to come from any source." Nothing could be more misleading in many instances than to speak of "close supervision." The important phrase is "from any source."

Serious damage may be done to international good will through those who come here with the impression that they will obtain graduate medical training, which, when under the proper auspices in this country, is unequalled in the world. Fortunately, for international relations, very few of the foreign physicians intend to return to their own countries. Hence, the false and pious claims of educating them in hospitals which offer no instructional plan will not have too serious an adverse effect on international relations.

The following recommendations were made in a recent statement by the Assistant Commissioner for Professional Education and the Secretary of the New York State Board of Medical Examiners:

> Since a large percentage of all foreign medical graduates desire to be licensed in New York, the following suggestions are offered to hospital administrators and chairmen of intern committees for assisting foreign medical graduates to establish eligibility for admission to the medical licensing examinations in the State of New York:
>
> Advise all Continental European doctors who graduated between 1939–1950 that their medical education is considered unapproved, except university graduates of Great Britain. (Others have been added since the publication of the advice.)
>
> Advise all Latin and South American graduates that their education is unapproved, regardless of the time of graduation.
>
> Advise all Asiatic graduates, except from the University of the Philippines, that their medical education is unapproved, regardless of the time of graduation.

In spite of the admonitions of the educational authorities, the State has officially made it easier than ever for the graduates of those very schools which do not meet the approval of the authorities to enter the hospitals of the community.

It is likely that next year there will be as many graduates from foreign schools seeking admission to the hospitals of New York as will be graduated from the nine medical schools of the State.

We are rapidly creating two classes of citizens in the State of New York in terms of medical care received. Those of the first class will be

attended to by graduates of approved medical schools; those of the second class will receive medical care under the internship and residency program largely by graduates of unrecognized medical schools.

The new law of the State of New York also requires that an American who is a graduate of an approved medical school and is serving as a hospital resident in a voluntary hospital must have either a permanent or a temporary license to practice medicine in the State. On the other hand, aliens from unapproved medical schools and the residents of all municipal and state hospitals, many of which have little or no training programs, will be specifically exempted by the law from the license requirement. The legislation gives preferential treatment to aliens who are graduates of unapproved medical schools from every part of the world.

New York has taken an easy short cut to meet an immediate and difficult situation in some of the hospitals. Following the course of least resistance is a surrender to mediocrity and, in the long run, is no solution at all. Many of the hospitals are obviously having difficulties securing a house staff and every constructive effort should be made to help solve the problem, but no solution that would destroy the worthwhile educational plan that has been developed during recent years should be advocated. It would be far wiser to find a solution to the present dilemma with some other device than a camouflage.

The situation now developing is of considerable concern for the present but its implications for the next decade or two are serious because the State, in fact, is permitting and actually encouraging conditions that will lead to a lower level of medical practice during the next generation. The price of maintaining proper objectives is eternal vigilance and courage. Under the new legislation, we must recognize early signs of deterioration in medical services in New York, a State which has long been a leader in maintaining educational standards.

APPROVAL OF INTERNSHIPS AND RESIDENCIES

On the national level, the cause of one of the difficulties has been the approval of many hospitals whose programs cannot be regarded as satisfactory educational experience for internship and residency training. The report of the Advisory Committee on Internships of the Council on Medical Education and Hospitals, published earlier this year, points to many of the defects and inadequacies that exist in internship training.

Translating some of these recommendations into enforceable conditions for approval of internships would be an important step forward. The overall problem can be solved only if the accrediting agencies assume real responsibility in enforcing proper standards for approval of internships and residencies.

Many individuals in hospital groups argue that the medical schools should be expected to produce enough physicians each year to fill all of the approved internships (11,467) and residencies (20,971) although many of them offer little or no real educational opportunities and the numbers of such positions exceed the output of medical schools. To do so, assuming that enough reasonably well-qualified students could be recruited, would be to produce physicians in excess far above the needs of the nation and to move further in the direction of lowering the accepted standard of medical education.

FINANCING OF STUDENTS

Previous reports dealt with the financial problem of medical schools. There is one aspect of the broad question, however, that is of direct concern to all who recognize that regardless of how the community services are organized or maintained, the ultimate quality of medical care depends on the recruitment of qualified students. Here, a particularly difficult problem to which very little attention is given arises. At the present time, due to economic circumstances of most families and students, large numbers of qualified students are unable to pursue a professional education.

Fewer than one-half of those capable of acquiring a college degree enter college, and 40 per cent of those who enter colleges do not complete their education. This indicates that an enormous reservoir of potential talent is lost each year due, in many instances, to financial difficulties. The nation must depend upon the brain power of its scientists, physicians, and research workers to contribute to its leadership in the world. The fact that the country is spending less than one per cent of its income on higher education suggests that American ingenuity can find a way to assist the crucial unit of education—the student.

One of our national leaders recently said: "We live in a time for greatness and greatness cannot be measured alone by the yardsticks of resources, know-how, and production. There are moral dimensions too."

The hope of Democracy lies in trained leaders. The medical and allied professions are the trustees of the essential knowledge which contribute substantially to solutions of the problems of individual and national well-being, happiness, and vigor. Possessing that knowledge, the professions are in a position to make and are challenged by the responsibility of making a vital contribution to the public welfare. The medical profession will occupy its proper place in modern society to the extent that it provides leadership and educated personnel equipped to meet its future obligations.

In closing, may I paraphrase a statement made only a few years ago by the late President Lowell of Harvard University, commenting on the progress of civilization. He said: "It is hardly an exaggeration to summarize the history of the last four hundred years by saying that the leading idea of the conquering nation in relation to the conquered was in 1600 to change its religion; in 1700 to change its laws; in 1800 to change its trade; and in 1900 to improve its health. May we not say that on the prow of the conquering ship, during the four hundred years, first stood the priest, then the lawyer, then the merchant, and today the physician."

DEPARTMENT OF ANATOMY

Professor Samuel R. Detwiler, Executive Officer

Assistant Professor Charles R. Noback has been promoted to Associate Professor of Anatomy. Dr. Margaret R. Murray LeDoux has been promoted from Assistant Professor of Surgery to Associate Professor of Anatomy. Dr. Malcolm B. Carpenter, the recipient of a John and Mary R. Markle Foundation Scholarship, has been appointed Instructor in Anatomy on a full-time basis. Dr. Edwin C. McDowell, for many years connected with the Cold Spring Harbor Laboratory, has been appointed Associate in Anatomy. Associate Professor Dan H. Moore has been transferred from the Department of Anatomy to the Department of Microbiology.

The Department of Anatomy registers with regret the retirement, on March 15, 1953, of Mr. Carl Kellner, medical illustrator for the Department for twenty-three years. During this period he illustrated hundreds of scientific articles and a score of books from the Department. His knowledge of anatomy and his many artistic skills combined to make him one of the outstanding medical artists of the country.

Professor Emeritus Philip E. Smith, Professor Wilfred M. Copenhaver, and Professor Dorothy D. Johnson have completed the preparation of the

thirteenth edition of *Bailey's Textbook of Histology*. Professor Adolph Elwyn has completed the third edition of Strong and Elwyn's *Human Neuroanatomy*. Professor Emanuel Kaplan has completed his book on the *Functional and Surgical Anatomy of the Hand,* published by J. B. Lippincott Company. The third edition of *Dental Anatomy* by the late Professor Moses Diamond has been published by the Macmillan Company. Valuable contributions to certain chapters in the book were given by Professor William M. Rogers.

Fifteen basic science courses for residents of affiliated hospitals have been offered, with a total registration of 134.

Professor George K. Smelser and his assistant, Mrs. Darren Chen, are engaged in chemical studies on the cornea when contact lenses are worn. Apparatus has been devised for measuring corneal transparency and thickness in vitro. Their studies are concerned with the mechanism by which corneal transparency is maintained in land and aquatic animals.

Professor Herbert O. Elftman has continued his cytochemical research with particular emphasis on the Golgi apparatus. He has succeeded in correlating the structure of the Golgi apparatus with the characteristics of the phospholipids which it contains. Improved methods for the study of phospholipids in tissue sections, developed during this investigation, are being applied to other cytological problems.

Professor Dan H. Moore, in collaboration with Professor Cushman D. Haagensen of the Department of Surgery and Professor Leon Dmochowski, Visiting Professor from Leeds to the Department of Microbiology, is continuing the effort to determine the etiology of mouse mammary cancer. Studies on the development of viruses in cells with the aid of the electron microscope have been carried out in collaboration with Professor Harry M. Rose and Dr. Councilman Morgan of the Department of Microbiology. In addition to electrophoretic and chemical studies, electron microscopy of sections has aided materially in Professor Moore's studies of changes caused by shock-producing injuries. The New York Society of Electron Microscopists, of which Professor Moore is chairman of the bibliography committee, has established a worldwide bibliographic service which will be available in September, 1953.

Professor Wilfred M. Copenhaver spent a large portion of his time in helping prepare the thirteenth edition of *Bailey's Textbook of Histology*. He is engaged in experimental studies on the development of the heart. Histochemical studies on the impulse conduction system are in progress.

Professor Kaplan, whose book on the hand was completed, is actively engaged in several investigations of importance to orthopedic surgeons. One of these is concerned with the relation of nerve roots to the foramina of the spine. Another deals with experimental studies on joint reflexes. Professor Kaplan continues to conduct with enthusiasm and efficiency a basic science course for orthopedic residents.

Professor Noback is engaged with histochemical studies on the Wallerian

degeneration of peripheral nerves. These studies are supported by a grant from the Coordinating Council for Cerebral Palsy in New York City, Inc. An investigation dealing with the relation of the premaxillary bones to the development of the upper jaw by Professor Noback and Dr. Melvin Moss has been completed. Professor Noback has also begun a study of the brain stem nuclei of the gorilla.

Professor Edmund Applebaum and Dr. Alexander Seelig have contributed three chapters to a new text on pediatric dentistry to be published by C. V. Mosby Company. Professor Applebaum and his associates have evaluated a large number of experimental and clinical findings and have incorporated them into the course in dental anatomy. A large number of histological sections of teeth, jaws, and temporomandibular joints of experimental animals are being prepared.

Professor Harry H. Shapiro, in collaboration with Dr. Sidney L. Horowitz of the Department of Dental and Oral Surgery, has completed a study dealing with the effects of the removal of the muscles of the cheeks and lips upon skeletal development in young rats. Professor Shapiro is engaged in the preparation of the third edition of his book on *Applied Anatomy of the Head and Neck* for J. B. Lippincott Company.

Professor Dorothy D. Johnson has given considerable time in helping prepare the thirteenth edition of *Bailey's Textbook of Histology*. She has continued her studies of kidney changes that follow implantation of mouse sarcoma 180 into normal and gonadectomized hamsters.

Professor Charles A. Ely is studying the effect of antigonadotrophic sera on interstitial cell tumors produced in A strain mice as a result of prolonged estrogen treatment and on gonadal tumors arising in ovaries and testes transplanted to the spleen of castrated animals. Concomitantly, factors influencing the development of antigonadotrophic activity and the properties of antigonadotrophic sera developed against crude sheep pituitary extracts are being observed.

Professor William M. Rogers has been investigating the time of nerve regeneration in relation to age in various animals. The study also involves the function and structure of motor end plates during nerve degeneration. He has constructed an improved electronic stimulator which he and Dr. Henry Aranow, Jr., of the Department of Medicine are using for a study of recovery time in normal and myasthenic muscles. In collaboration with Dr. Alfred J. Magee of the Department of Ophthalmology, action potentials of eye muscles at rest and during voluntary and nystagmic movements are being studied. With Dr. Solomon L. Katz of the Department of Dental and Oral Surgery, he has completed roentgenographic and functional studies on deviation patterns in the human temporomandibular joint.

Professor Frederic J. Agate, supported by a grant from the American Cancer Society, Inc., is conducting investigations on the histological and chemical

changes in the adrenal following gonadectomy and hypophysectomy. Further studies are being conducted on experimental nephrosis produced in hamsters subsequent to heterologous implantation of mouse sarcoma 180. This investigation involves changes in the adrenal and blood cholesterol and body-temperature changes. In collaboration with Professor Perry B. Hudson of the Department of Urology, a study has been completed on the ascorbic acid content of adrenal glands from human cancer patients before and after ACTH administration. A similar project is in progress to study the succinic dehydrogenase activity of the human adrenal.

Dr. Christian A. Hovde has been investigating the electrophysiologic phenomena resulting from electrical stimulation of the putamen in the cat. Single shock stimulation results in recordable activity in the cortex in 1–2 Msec with a focal activity located in the dorsal portion of Brodmann's area 10. Research on the connections of the putamen and globus pallidus is being conducted. This work is supported by a grant from the Neurological Diseases and Blindness Council of the National Institutes of Health. Dr. Hovde, with Mr. Harlan Stearns of the Rockland State Hospital, has also begun a cooperative investigation dealing with the biochemical changes that are believed to be responsible for the deterioration and death of animals which follow bilateral caudate removal.

Professor Samuel R. Detwiler is continuing his experimental studies on the induction of accessory retinas. In collaboration with Dr. Howard Holtzer of the Department of Anatomy of the University of Pittsburgh, an investigation dealing with the inductive action of the spinal cord on the development of the axial skeleton has been completed. Removal of the embryonic spinal cord is followed by a failure to form vertebrae and ribs. Supernumerary grafted embryonic spinal cords will induce the formation of secondary axial skeletons from tissues already labeled to form muscles.

Professor Detwiler was elected first Vice President of the American Association of Anatomists.

DEPARTMENT OF ANESTHESIOLOGY

Professor Emanuel M. Papper, Executive Officer

Much of the effort of the Department of Anesthesiology has been devoted to the development and enlargement of the staff, the physical equipment, and the extension of the research program in the University. These spheres of activity have progressed satisfactorily. However, concentration on development problems and their solution has caused the deferment of serious consideration of the broader functions of anesthesiology in the health of the community and, ultimately, the nation. The needs in anesthesiology must be met as are the needs in other fields of medicine—by the encouragement and adequate sup-

port of research and the training of competent physicians. It is the opinion of the Department that the time has come to consider the public-health aspects of anesthesiology from these twin points of view—research and training.

It has not been properly appreciated that the mortality—and probably the morbidity rate—from anesthesia is a national problem of grave importance. A five-year study of anesthetic deaths in ten leading university hospitals in the United States was completed this year by a subcommittee of the National Research Council. It surveyed some 600,000 anesthetic administrations. These, it must be emphasized, were carried out in the best institutions, where anesthetic care is excellent. The overall death rate in these institutions was 1 in 1,630 cases. The mortality rate in the Medical Center of 1 in 3,000 cases compares favorably with the general average. However, if one assumes that there are approximately 10,000,000 operations performed annually in the United States, then it could be assumed that the mortality from anesthesia is from 8 to 10 times that of poliomyelitis. The support of research in poliomyelitis has far exceeded the interest in the problems of anesthesia. It is necessary to convey to appropriate and interested groups how important anesthesia is to public welfare, and to emphasize that greater support for research in this field must be forthcoming if the mortality rate is to be lowered. The problem of anesthetic mortality is even more pronounced with small children and Negroes—the death rates from anesthetics in these groups are considerably higher than that of the general population.

The second phase in tackling a mortality problem of this magnitude is training physicians more securely in the discipline of maintaining adequate airway during anesthesia and properly supporting the circulation during operative procedures. It appears necessary that this should be undertaken with undergraduate medical students as well as with house officers. It has been pointed out in a previous report that this goal is not as yet fulfilled satisfactorily with respect to undergraduate medical education. It is most sincerely hoped by the Department that there will be an implementation of a plan to be submitted which will improve the awareness and education of medical students in this discipline of medicine. This statement is made with the realization that the curriculum of the medical student today is unduly crowded. It is necessary to realize, however, that time must be found to provide information which may save lives in the future practice of these physicians.

During the year, the Faculty was strengthened by the appointments of Dr. Robert C. Peterson, Dr. Bernard R. Fink, and Dr. Beatrice Gilbert to the staff. This strengthening of Faculty was offset, unfortunately, by the departure of Dr. Edgar C. Hanks and Dr. Frederick W. Hehre, Jr., for duty in the Armed Forces.

The research program has continued to develop in a gratifying manner both in the University and in the Presbyterian Hospital. Professor Duncan A. Holaday and Dr. S. Louis Carpenter have continued their studies on the

alterations of acid base balance during anesthesia. They have concluded that gross alterations in acid base balance are not unusual during anesthesia. The plasma pH may fall as low as 6.90 and the CO_2 tension of the plasma may rise to 150 millimeters of mercury. The alkali reserve of the blood may also be diminished significantly. These changes are attributable to the accumulation of fixed acids in the blood resulting from the administration of ether and from hypoventilation resulting in respiratory acidosis during any type of general anesthesia. Professor Holaday has carried on his development of micromanometric methods for the analysis of blood gases in the presence of anesthetic agents. Professor Holaday concluded his studies on the influence of DFP on transmission through autonomic ganglia. These studies were carried on in collaboration with Professor George Koelle and Dr. Kazuia Kamijo of the Department of Pharmacology. High doses of DFP depressed transmission and, to a lesser extent, conduction through these ganglia. The depression was interpreted as being due to a direct action of DFP or its products of hydrolysis.

Professor Holaday has continued his studies of the metabolic acidosis which is associated with carbon dioxide retention during anesthesia. Attempts to understand the mechanism of this interesting pattern of metabolic acidosis are concerned with observations on representative intracellular compartments of the body with respect to carbon dioxide content and tissue electrolytes. These observations on intracellular compartments are being related to extracellular concentrations of these substances.

Professor Holaday and Dr. Carpenter have undertaken a study of respiratory dynamics during anesthesia. Their studies of the relationship between imposed respiratory pressures and gas flow have been pursued in an effort to find the principles which must be incorporated in a generally applicable mechanical respirator for anesthetic purposes. They have defined thus far the limits of gas flow at different rates of ventilation and with different mask pressures which are necessary to produce adequate alveolar ventilation during anesthesia.

Professor Holaday and Drs. Carpenter, M. Jack Frumin, Herman Schwartz, and Carter M. Ballinger have begun a series of studies of circulatory dynamics during anesthesia. They are interested in the effects of assisted and controlled respiration, alterations of acid base balance, and the direct effect of cyclopane upon the circulation. These studies are in a preliminary stage, and will require the assistance of Dr. Samuel R. Powers, Jr., of the Department of Surgery for the measurement of cardiac output during anesthesia for satisfactory completion.

Dr. Shih-Haun Ngai, in collaboration with Professor Shih-Chun Wang of the Department of Physiology, has continued his studies on the neural control of respiration. From studies on cats, they have concluded that the pneumotaxic center is localized in the dorso-lateral reticular formation of the rostral pons. Electrical stimulation of this center accelerated respiration and localized

destruction of the same structure with bilateral vagotomy resulting in apneustic breathing. They also concluded that the lateral reticular formation of the caudal pons is a structure from which apneusis originates. It was apparent that the modulating effect of the vagal afferents and the pneumotaxic center is exerted on the pontile apneustic mechanism. The medullary respiratory centers seem to serve as a common motor pathway under normal conditions and the influence of many functional factors. Dr. Ngai, in collaboration with Professors Wang and Holaday, has also undertaken a study of action potentials with ultra-micro-electrodes to elucidate further the phenomena of the neural control of respiration. These studies are too preliminary to draw conclusions.

Dr. Ngai and Dr. Eleanor C. Nelson have studied the changes in cerebral blood flow during induced hypotension with hexamethonium bromide in the anesthetized dog. They were able to show in early experiments that the cerebral blood flow decreased in proportion to the fall in arterial blood pressure. This is not surprising but it is in conflict with the impressions gained during this type of anesthetic management in clinical work.

Dr. Frumin, in collaboration with Professor Holaday and Drs. Herman Schwartz, Carpenter, and Carter M. Ballinger, has continued his studies on the circulatory and respiratory changes during and after cyclopropane anesthesia. It was found that the characteristic hypertension during anesthesia was unrelated to the hypercapnia frequently associated with the administration of cyclopropane. They observed evidence, in the form of peripheral pulse contours, that there might be a sharp rise in total peripheral resistance during cyclopropane anesthesia. Following the termination of anesthesia, the arterial pressure returned to preoperative or lower values with evidence of a sharp decrease in total peripheral resistance. These findings were not associated with a pre-existing respiratory acidosis or alkalosis.

Dr. Frumin and Dr. Schwartz completed their studies on the mechanism of blockade during spinal and peridural anesthesia. They have corroborated their earlier observations that the dura is freely permeable to procaine when the drug is injected in the peridural space. The evidence is clear that at least part of the blockade of peridural anesthesia is due to the denervation of neural elements within the subarachnoid space.

Professor Virginia Apgar has continued her studies on respiratory problems of the newborn. With Professor Richard L. Day and Dr. Alice Goodfellow of the Department of Pediatrics, she has carried out studies on excised lungs of animals and infant autopsy material. Their conclusions from these studies suggest that it is necessary to impose a rather high positive pressure for extremely short periods of time to expand premature or atelectatic lungs. These observations are not in agreement with previously accepted clinical practices. Work is in progress to determine whether this type of high positive pressure for critically short periods of time will be safe and suitable for clinical application. Professor Apgar's studies on the Bloxson Air-Lok

have been completed and demonstrate that this apparatus is inadequate for ventilation in apneic dogs, that it does not remove pulmonary fluid, and that it permits the accumulation of carbon dioxide. Professor Apgar believes that the current clinical enthusiasm for this apparatus in the resusciatation of the newborn appears to be totally unwarranted in light of her experimental studies as well as of clinical experience in the Sloane Hospital for Women. Professor Apgar's development of an objective evaluation of newborn infants has continued. The correlation of this numerical scoring with infant mortality and morbidity appears to be good. Professor Apgar's method of evaluation has been adopted in several other institutions.

Dr. William S. Howland, in collaboration with Dr. Eleanor C. Nelson, Professor Ralph A. Deterling, Jr., and Dr. Shivaji B. Bhonslay of the Department of Surgery, has studied hypothermia in the dog. These studies were designed to gain information and experience dealing with reduced body temperatures in the preparation for subjecting patients to operation for the correction of certain types of cardiovascular defects. They corroborated some of the findings of others with respect to the changes in respiration and the circulation. They are devoting their efforts to a better understanding of the mechanism of ventricular fibrillation which occurs in some 25 per cent of animals, and to an understanding of the metabolic changes that occur during reduced body temperature.

Dr. Beatrice L. Selvin has completed her studies of the significance of myanesin on postoperative pain following spine fusion operations. There is no evidence that this compound produces analgesia by virtue of the relaxation of skeletal muscle.

Dr. Robert C. Peterson, in collaboration with Dr. Bernard B. Brodie of the National Heart Institute, Dr. John Burns of the Research Service of Goldwater Memorial Hospital, and Professor Emanuel M. Papper, has continued the Department's studies of the ultra-short-acting thiobarbiturates. He has completed metabolic studies of two N-Alkyl thiobarbiturates in man. These newer compounds behave in a manner similar to that of thiopental, which has been described in previous reports. In fact, all the newer thiobarbiturates examined in the last six years have not behaved in a manner significantly different from that of thiopental. With this group, Professors Papper and Philip A. Lief have studied and reported on the metabolism of pentobarbital in man. This compound is more slowly degraded than thiopental and, in general, is unsuitable for human clinical anesthesia. Professors Papper and Lief have completed their studies on meperidine, with the exception of examining its behavior in drug addicts. These studies with drug addicts are to be carried out with the collaboration of Dr. Harris Isbell at the Public Health Hospital in Lexington, Kentucky.

Professors Papper and Holaday have continued their collaboration with Professors Arthur H. Blakemore and Deterling and Drs. Hugh F. Fitzpatrick and Samuel R. Powers of the Department of Surgery in the study of the

anesthetic and surgical aspects of certain types of cardiovascular disease. From the standpoint of anesthesia, it has been established that the injection of procaine into the pericardium or the heart does not serve to protect the heart from disorders of rate or rhythm during cardiovascular operations, but may actually accentuate them and produce an associated hypotension. These studies have been utilized in the operating room in that procaine administration in operations upon the heart and great vessels has been abandoned.

Dr. Herbert Rackow has adapted a method for the quantitative analysis of lactic acid in the studies, reported above, that were carried on by Professor Duncan A. Holaday. In collaboration with Dr. James B. Campbell of the Department of Neurological Surgery, he is also engaged in a study of sympathetic and parasympathetic innervation of the genitourinary system. Dr. Rackow, together with Dr. Frumin, developed a simple and satisfactory method for nasopharyngeal insufflation of nitrous oxide oxygen anesthesia.

Dr. Edgar C. Hanks has continued his follow-up and studies of patients who have had cardiac arrest during anesthesia and operation. He is currently collecting information on patients who have been subjected to reoperation following a previous cardiac arrest.

Dr. Frederick W. Hehre, in collaboration with Professor John Scudder of the Department of Surgery, has completed his study of PVP.

Dr. Bernard R. Fink has shown in preliminary studies that some degree of anoxia may accompany the elimination of gaseous anesthetic agents. Presumably, this occurs by physical dilution. Dr. Fink has developed a modification of the Leigh nonrebreathing valve for more satisfactory use in children during operations involving the open chest. He has also developed a device for accommodating a nasogastric tube through a face piece in the circle technique of closed anesthesia. Dr. Carpenter, in addition to his other studies, has developed a gastric tube to prevent the aspiration of vomitus during inhalation anesthesia. He has completed experiments on the dog and cat. Studies in man are in progress to develop a workable, clinical model.

The Department was particularly honored that among its distinguished visitors during the past year was Dr. Ivan Magill, Consultant in Anaesthetics to the Ministry of Health of Great Britain. During the year, Professor Apgar was the guest of the Australian and New Zealand Societies of Anaesthetists and delivered a series of lectures in both countries. Professor Emanuel M. Papper was one of the co-founders of the Association of University Anesthetists.

DEPARTMENT OF BIOCHEMISTRY

Professor Hans T. Clarke, Executive Officer

Instruction in biochemistry has been given to the first-year medical and dental classes and to 54 graduate students under the Faculty of Pure Science

and the School of General Studies. Of the graduate students 32 were working toward the Ph.D. degree in biochemistry, 6 were at an introductory level, and 26 were doing advanced work. Of the 12 graduate students with major interests in other departments, only 6 received laboratory instruction. During the year, 6 students completed the requirements for the Ph.D. degree.

Professor Erwin Brand and his group, under the sponsorship of the Office of Naval Research, have continued their studies on the synthesis and properties of polypeptides containing both L and D forms of amino acids. A considerable number of new peptides containing ornithine, tyrosine, phenylalanine, and glutamic acid has been prepared; a decapeptide corresponding to gramicidin S has been synthesized. Professor Brand has developed further the photoelectric spectropolarimeter—it is now possible to determine rotatory dispersion in the ultraviolet regions. New information has been gained on the residue rotations of amino acid residues in peptides.

Professor Erwin Chargaff and his associates in the laboratory of cell chemistry of the Institute of Cancer Research have continued their studies on problems of nucleic acid chemistry and metabolism, on nucleoproteins, and on the chemistry of inositol-containing lipids. Professor Chargaff's group included Dr. Charles F. Crampton, Research Fellow of the National Foundation of Infantile Paralysis, Dr. Marion E. Hodes, United States Public Health postdoctoral fellow, and three visiting scholars from abroad, Dr. John N. Hawthorne of the University of Birmingham, Dr. Edward A. Johnson of the London Hospital, and Dr. Penina Spitnik of the Weizmann Institute in Israel.

Professor Hans T. Clarke has returned to his duties as Executive Officer of the Department and has resumed the guidance of work on carboxymethyl derivatives of proteins and amino acids.

Professor Zacharias Dische has continued his studies on the role of heptosephosphate as intermediate in the synthesis of hexosephosphate from ribose-5-phosphate and has developed methods for the determination of heptose. He has investigated the neutral mucopolysaccharides of the serum and the influence of ATP on the oxidative metabolism of the heart.

Professor Goodwin L. Foster has continued his studies of amino acids and their derivatives.

Professor Maxwell Karshan has taken charge of the course in biochemistry for dental students and has continued his studies of the etiology of periodontal disease.

Professor Edgar G. Miller, Jr., has devoted most of his efforts to instruction and to University problems and has continued to serve as nominal responsible investigator in connection with the work of Professor Brand and his group.

Professor David Rittenberg and his group have continued studies on the mechanism of the action of enzymes. Under his guidance, Dr. Ronald Bentley, who during the year left to accept an Assistant Professorship in the School of Public Health at the University of Pittsburgh, investigated the action of

several lipases and choline esterase; Dr. Harvey Fisher has obtained cell-free preparations of bacterial hydrogenase; and Dr. Renate Dische completed an investigation of the metabolism of phenylalanine. In collaboration with Professor Irving M. London of the Department of Medicine, Professor Rittenberg has applied the isotope technique to problems of clinical medicine, especially with reference to the mechanism of the formation of the red blood cell under pathological conditions.

Dr. Victor Ross has investigated the quantitative relations involved in salmine and proteins of lower isoelectric points and has studied the free amino acids present in the blood and organs of mice in shock following thermal injury.

Professor David Shemin, with the collaboration of Dr. Robert Labbe from the University of Oregon and Dr. Eric Simon from the University of Chicago, has continued his studies of the biosynthesis of porphyrins and has confined the role of the tricarboxylic acid cycle in porphyrin formation. He has synthesized coproporphyrin III isotopically labeled in specific carbon atoms and has initiated a study of the mechanism of chlorophyll synthesis. He has synthesized a new derivative of succinate and glycine which appears to be another intermediate in porphyrin synthesis and has prepared S-Succinyl coenzyme A by a method which appears to be a general procedure for the preparation of S-acyl coenzyme A derivatives.

Professor David B. Sprinson has continued his work on the biological synthesis from serine of the methyl groups of thymine and choline and of purines; on the biosynthesis of shikimic acid, a central intermediate in the formation of aromatic compounds; and on the biochemical synthesis of sphingosine.

Professor Stephen Zamenhof, in collaboration with Professor Hattie E. Alexander of the Department of Pediatrics, has continued his studies of transforming principles of Hemophilus influenzae and Neisseria meningitidis; of the resistance of heredity determinants to mutagenic and carcinogenic agents; of the denaturation of nucleic acids; and of the chemical nature of type specific substances of Hemophilus influenzae.

Speakers at departmental seminars included Dr. Jesse Greenstein of the National Cancer Institute, Dr. Feodor Lynen of the University of Munich, Dr. E. L. Patterson of Lederle Laboratories, and Dr. Herman O. L. Fischer of the University of California.

DEPARTMENT OF DENTAL AND ORAL SURGERY

Professor Maurice J. Hickey, Executive Director

The Department of Dentistry has completed the academic year with the largest undergraduate student registration since 1945. The larger classes have severely taxed the teaching staff and the available clinical facilities.

The return of several part-time teachers, who were on leaves of absence for military service, has tended to balance the loss of other faculty members to the military services.

The resignations of Assistant Professor Oscar Beder and Associate Professor Max Pleasure were accepted with regret. Professor Beder accepted a full-time position at the University of Washington, Seattle; and Professor Pleasure joined the full-time staff of the Veterans Administration Hospital, Bronx, New York. The vacancies created by these resignations were filled with the appointment of Dr. Joseph DeLisi as an Assistant and Dr. George Schwendener as an Instructor.

It has been gratifying to watch the continued strengthening of interdepartmental relationships, which has proved once more the wisdom of faculty integration.

The demand for admission to the School of Dental and Oral Surgery continues at a high level in spite of a steady decline in the number of applications received during the last two years. A total of 426 applications—a drop of 160 from the previous year—was processed and 40 students were admitted to the first-year class. This represents a ratio of 10.65 applicants to each accepted student. Applications were received from 23 states, the District of Columbia, Hawaii, and nine foreign countries. The accepted students represent five states.

DENTAL CLINIC

During the twelve-month period, from May 1, 1952, to April 30, 1953, the Dental Clinic admitted 14,902 patients. Of this number, 5,201 were new patients and 9,701 were former patients readmitted. There were 2,622 patients referred from the hospitals of the Medical Center; 780 teachers and students from Columbia University; 450 of the Medical Center or Columbia University personnel; and 4,379 from other sources. This represents an increase of 1,895 patients over the previous year. There were 45,140 clinic visits, an increase of 3,084. The Operative Dentistry Clinic completed 3,035 procedures, an increase of 700. The Prosthetic Clinic completed 877 cases, an increase of 174. The increase in clinical procedures can be explained partially by the fact that 12 more students than the previous year were working in the clinic.

DIVISION OF OPERATIVE DENTISTRY

In this area of clinical dentistry the Division, under the direction of Professor Carl R. Oman, has continued its efforts to teach dentistry through research, the correlation of basic science, and clinical instruction. This was accomplished without minimizing the importance of technical teaching, still the greatest ally in the struggle to control dental disease.

Dr. Steven Scrivani has returned after serving with the United States Army Dental Corps and has resumed his teaching duties with the Division of Operative Dentistry staff.

Staff members of this Division have continued active clinical research. Professor Harold Sherman and Dr. Joseph E. Fiasconaro have completed a project on a comparative evaluation of high-potency local anesthetics. They are continuing their study of the quantitative evaluation of dental pain by means of digital plethysmography.

Professors Edward A. Cain, Jr., and Sherman and Drs. Fiasconaro and Kenneth Deesen, under a grant from the Acralite Company of New York, are engaged at present on a project to determine the sealing properties of a new acrylic resin filling material.

Drs. Joseph M. Leavitt, Richard C. Fowler, Irving J. Naidorf, and William Miller of the Endodontia Division are collaborating on a project to evaluate from the clinical records the effectiveness of Squibb's Polyantibiotic preparation in sterilizing infected root canals. They have also initiated a program of a clinical and bacteriological evaluation of the effect of commonly used root-therapy medicaments in eliminating infection—including the identification of the specific bacteria involved.

The entire staff has contributed extensively to the programs of various professional societies.

DIVISION OF ORAL SURGERY

During the academic year the main efforts of this Division, under the leadership of Professor Joseph Schroff, were directed toward improving clinical instruction of undergraduate students. Seminar discussions at the end of each period—time permitting—were conducted. Active student participation in these seminars provided an opportunity to bring together elements of earlier basic science teaching related to oral surgery.

The material available for clinical research in oral surgery lends itself well to interdivisional cooperation. A project to study the implantation of vitalium in edentulous mandibles is being carried on in cooperation with the Prosthetic Division.

The return from military service of Drs. Kourken A. Daglian, Stanley F. Nief, and Robert G. Kroll has helped to alleviate the teaching load.

The number of applications for postgraduate instruction in Oral Surgery, a two-year full-time course, continues at a high level.

DIVISION OF ORTHODONTICS

Professor Arthur C. Totten continues to direct the activities of this Division. Although orthodontics is considered largely a postgraduate teaching subject, the Division provides instruction to undergraduate students. Instruction in the prevention and correction of simple types of malocclusion and adult orthodontics for restorative procedures provides the undergraduate student with an understanding of the principles of orthodontia. This teaching equips him to render a service that in many cases will make specialist care unnecessary.

The demand for postgraduate training in this area continues to be high. Twenty-one students completed the sixteen-month course leading to a certificate. Many more apply than can be accepted.

The need for the development of a crippled children's clinic is again stressed.

The understanding of orthodontia is largely based on an understanding of growth and development. Research in this area is handicapped by the lack of personnel competent to carry on careful studies in child growth and development.

The Division continues to be active in clinical research. Under way are studies relating to occlusion; temporomandibular joint problems, in cooperation with the Department of Anatomy; the effects of orthodontic appliances on caries rate in children; radiographic findings in Cooley Anemia; and a project to determine the effect of obturators in cleft palate speech.

The staff of this Division remains very active in professional society activities and provides a large number of speakers and clinicians for meetings in many widely separated areas of the country.

DIVISION OF PEDODONTICS

This Division was created and directed for many years by Professor Ewing C. McBeath. The retirement of Professor McBeath is sincerely regretted. The supervision of the Division of Pedodontics has been assumed by Associate Professor Solomon N. Rosenstein.

The clinical practice phase of the curriculum represented a greatly increased assignment for our instructional staff because the senior class was approximately fifty per cent larger than the senior class of the previous year. Nevertheless, the teaching staff maintained the close instructional supervision essential for the proper teaching of pedodontics. High standards of service were maintained, and the clinical results were indeed gratifying.

One hundred and forty-five children were admitted to the clinic. The total number of visits was 1,250. The average number of visits per child was 8.6. The total number of completed restorations and treatments was 1,515. Throughout the year, the Division maintained an average of 1.2 completed fillings or treatments per visit per child. Fifty-one cases requiring special pulp-management procedures were demonstrated.

The completed restorations included 26 full crowns of two newly developed types. These were extremely helpful in the cases of young children with extensively decayed dentitions. The use of one of these new-type restorations has been indicated with increasing frequency and, because of its greater cost, warrants a revision in the Children's Clinic fee schedule.

The instruction relating to child-patient management represented a most important phase of the curriculum. The ages of the children admitted to the clinic ranged from two years and four months to eleven years. Several very

young children—three years of age and under—were admitted for special teaching purposes. The students' efforts to establish the proper rapport with these children—though trying at first—were highly successful. These examples, as well as others, demonstrated again the validity and practicability of the Division's principles of child management.

Two postgraduate students, the junior recipients of the Cerebral Palsy Fellowships in Pedodontics, attended the Pedodontics Clinic for one session of clinical practice per week for the entire academic year. Additional time was scheduled for conferences with the junior and senior Fellows.

Professor Rosenstein has continued his collaboration with the members of Pediatric-Sloane Study for the research in the relationship between prenatal disturbances and malformations in infants. Other researches include tooth-conservation studies and the study of full-mouth roentgenograms to determine normal ranges of variation in tooth development and eruption.

The program for the study of dentistry for the cerebral palsied child continues. Four Fellows in dentistry are now in full-time study. A service clinic is being operated by two part-time dentists. The teaching phase of this program is unique—it is the only one of its kind in existence.

DIVISION OF PROSTHETICS

Under the direction of Professor Gilbert P. Smith, this Division has continued to maintain its high standards in spite of severe faculty losses due to resignations and leaves of absence for military service.

Undergraduate instruction and preparation of teaching material take precedence over other endeavors. The available time of staff members is almost monopolized by these activities, and little time is available for research. A survey of the teaching load during the past four years shows a gradual increase, as indicated by the following table of student-teacher ratios:

1949–1950	*1950–1951*	*1951–1952*	*1952–1953*
5.96	6.50	7.98	8.55

Schedule changes have necessitated the reorganization of subject material in sophomore courses. Basic orientation in dental procedures has been transferred to the crown and bridge course. A revised plan of integration was established for the dental materials, crown and bridge, and prosthetic technique courses.

This Division still carries the largest teaching load of all divisions in clinical dentistry. The rearrangement of schedules worked out last year has helped to conserve and utilize better the available time of the teaching staff. The situation is still critical, and efforts must be made to find additional teachers if our standards of teaching are to be maintained. The resignation of two experienced full-time teachers created a serious situation. Replacements have been made with able, but younger men. Only with the fullest possible co-

operation of the staff has this Division been able to fulfill its obligation to the undergraduate students.

DIVISION OF STOMATOLOGY

This Division was established to consolidate the teaching efforts of Diagnosis, Radiology, and Periodontia. The Division is directed by Professor Lewis R. Stowe. The section of Periodontia is directed by Professor Frank E. Beube, and the section of Diagnosis and Radiology is supervised by Professor Edward V. Zegarelli.

During the past academic year experiments with seminar teaching were carried on. These were so successful that the formal lecture method of teaching undergraduate and postgraduate students will be discontinued. Seminars will substitute the formal lectures beginning with the 1953 fall classes.

Four out of the six graduate students in the course leading to the Certificate of Training in Periodontology are continuing their studies. Twelve additional students have applied for this course, but only five can be selected due to the lack of dental chairs and sufficient staff. There is a real need for more clinic space and full-time instructors.

Further experimental work is being carried on by Dr. Melvin Morris on surgical periodontal pockets in humans with particular reference to nonvital teeth. Professor Saul Schluger, in collaboration with Professor Zegarelli, is continuing his investigations on fibromatoses. Professor Beube has initiated studies on the differences in stresses to the periodontium from the use of fixed and removable appliances.

During the past year members of the Division have presented short courses at other dental schools and sixty-two lectures and clinics to dental societies throughout the country. Professor Beube's textbook *Periodontology: Diagnosis and Treatment* has been published by The Macmillan Company.

The section of Diagnosis and Radiology has been considerably handicapped in its activities by limited physical facilities. Efforts are being made to raise sufficient funds to make it possible to enlarge and modernize this clinic. In spite of the physical handicap, the activities of this clinic are many and varied. All new patients pass through the Diagnosis Clinic which also serves as a joint clinic for consultation purposes when one or more teaching areas are involved. With such a joint clinic it is possible to keep the student and the patient in one place and bring the faculty to them. Thus, the student receives the benefits of group teaching.

The flow of material through this clinic provides amply for an extensive research program. Part of this research program is carried on in cooperation with other divisions and with the Dental Service of the Francis Delafield Hospital.

The staff has provided a large number of speakers for various professional societies.

Fourteen papers from the section of Diagnosis and Radiology have been or are about to be published. Professor Zegarelli and Professor Joseph A. Cuttita have continued to provide teaching and consulting services to the Veterans Administration.

RESEARCH LABORATORY

This most vital activity of our teaching program is directed by Professor Barnet M. Levy. The one laboratory available for dental research is utilized to its maximum capacity. In spite of severe overcrowding, the work that is done in this laboratory is considered to be outstanding in the field of dental research.

During the past year the research program was devoted to problems of growth as affected by various physical and chemical agents.

In cooperation with the Radiological Research Laboratory the Laboratory has studied the effects of x-irradiation on bone, teeth, and other organs. Several publications resulted from these studies.

Through the generous cooperation of Professor Samuel R. Detwiler, of the Department of Anatomy, the Laboratory has been able to complete some rather interesting studies on the differentiation and growth of teeth in salamanders. This work resulted in the conclusion that the salamander tooth is derived from neural crest cells. Dentin, in the salamander, is evidently of ectodermal origin. This creates a new concept in the field of dental embryology and will be studied further next year.

Studies on the production of oral neoplasia are nearing completion. Carcinoma of the tongue has been produced in mice—the first time intraoral carcinoma has been experimentally produced in animals. Also produced was a lesion in the mouse's tongue which resembles the granular cell myoblastoma of the human tongue. Histochemical studies of these two tumors are being concluded.

Studies on the development of histochemical techniques applicable to the dental structures are being continued. This is a five-year project and is being supported by an Office of Naval Research grant.

Dr. George Stein is continuing his studies on problems of nutrition as related to oral changes in the human and lower-animal organism.

Dr. Sydney Horowitz is continuing his studies on the effect of muscles on the growth of the rat skull.

Dr. Hans Neumann is continuing his studies on the physiology of teeth.

Dr. Austin Kutscher is continuing his research on the clinical evaluation of drugs.

In view of the fact that three grants—the United States Public Health Service grants D-84 and D-119 and the American Cancer Society Grant ENV-2A—are being terminated as of this July, the financial problem of these activities again becomes acute.

DIVISION OF DENTAL HYGIENE

Courses for Dental Hygienists, under the direction of Professor Frances A. Stoll, registered 28 students during the academic year 1952–1953. At the time of this report six candidates have been selected for the class entering in September, 1953.

During the past year the Alumnae Association of Dental Hygienists has provided a fund of $2,700 which is available for scholarships during the following year. This amount is offered in amounts up to $300 per student per year. Miss Barbara Cosenza of New York and Miss Nancy Risdon of Elizabethtown, Pennsylvania, received scholarships this year. These scholarships are mainly for the purpose of publicizing the profession of the dental hygienist among college women where it is little known.

The Council on Dental Education of the American Dental Association is currently conducting visits to the schools for dental hygienists for the purpose of establishing an accredited list of schools. This institution was visited on December 9, 1952. There is reason to believe that this school will be placed in the upper group of accredited schools—there were no discrepancies found in the administration, supervision, or curriculum of this school which has the highest educational requirement in the eastern part of the United States.

There are several additions to be made in the curriculum, including experience in the dental clinic for cerebral palsied children and the lectures and demonstrations on cleft palate.

An Assistant in Dental Hygiene was added to the staff to complete the field work in dental hygiene. Miss Hazel Tanji, of the University of Hawaii, who will be an Assistant in Dental Hygiene for an additional year in preparation for the directorship at the University of Hawaii, School for Dental Hygienists.

During the past year Miss Jacqueline Huot, graduate of 1952, became chairman of dental hygiene at the University of California and Miss Lorene Nelson, director of the new school in the University of Kansas City. Both graduates were promoted to their new posts after one year on the staff. Miss Marion Howell, graduate, completed a term as President of the New York State Dental Hygienists Association. Mrs. Barbara Carroll, Instructor in Dental Hygiene, is Secretary of the New Jersey Dental Hygienists Association.

A Symposium on the Contributions of Dental Hygienists to Dental Health Programs in Industry, held at the Annual Alumnae Day on April 26th, the first of its kind, brought together outstanding authorities in the field, including two graduates, Miss Alice Barnett, Dental Hygienist and Research Assistant of Delafield Hospital, and Miss Lillian Whitehouse of Metropolitan Life Insurance Company; Dr. M. Brand of the Sidney Hillman Health Center represented labor, Dr. H. DeCamp of the Corning Glass Company repre-

sented industry, Dr. E. Aston of Pennsylvania Department of Health represented government, and Dr. Alfred Asgis of New York University represented dental education.

With Professor Neal W. Chilton, of the School of Public Health, as Research Consultant, a research project on the evaluation of toothbrushes was completed. Student dental hygienists provided the sampling and assisted in collecting the data.

Professor Stoll has completed the manuscript of a guidance manual titled *A Career as a Dental Hygienist,* to be published in the fall of 1953.

The program for clinical experience with adult patients was conducted at the Dental Prophylaxis Clinic in the School of Dental and Oral Surgery. A total of 940 patient visits in 111 clinic sessions was completed. The Children's Clinic was conducted at 15 Amsterdam Avenue, the off-campus Clinic. A total of 597 patient visits during 66 clinic sessions was completed. The grand total is 1,537 patient visits during 177 clinic sessions.

The recruitment of suitable candidates is still a major problem. During the year, more than 5,000 pieces of mail have been processed, including information to possible candidates, high school and college counselors, and those who have made individual inquiries. A printed notice of scholarships, a brochure, and a position opportunity sheet was included with each letter. Bulletins of Information were sent to all schools and colleges from which inquiries were received.

During the months of February, March, and April programs were conducted in Centenary Junior College, Bergen Junior College, College of New Rochelle, Mary Louis Academy, and Bishop McDonnell High School. The Science Club of Marymount College visited the school on April 12th. Twenty-four girls were entertained at a tea by the senior class. For interested candidates from Packer Collegiate Institute, an afternoon tea and conference hour was held at the Towers Hotel in Brooklyn. On these vocational conference tours Mrs. Dorothy Decker, an alumna, attended, offering her services to the recruitment sessions in high schools, private schools for girls, and colleges of Northern New Jersey. Mrs. Decker reveals a particular aptitude for this work and has been encouraged to begin her visits in the early fall. The School of General Studies, through the faculty adviser for premedical and predental education, has cooperated in the recruitment program.

It has been suggested that recruitment by personal contact with young college women be made by an Alumnae project for the coming year. Many of our retired graduates can give time to this project with great benefit to the recruitment program. The director and the staff are unable, for lack of time, to canvass completely the potential sources of student candidates. There is severe competition for young women in the fields of nursing, physical and occupational therapy, and business which creates a very challenging problem in recruiting for dental hygiene.

TEMPOROMANDIBULAR JOINT CLINIC

The Temporomandibular Joint Clinic has continued its progress under the direction of Dr. L. Laszlo Schwartz.

The complexities of the problem of studying this area of the body have drawn together a group representing several departments of the Medical Center. Represented in this group are Professors Josephine S. Wells and Juan M. Taveras of the Department of Radiology, Professor Charles A. Ragan, Jr., of the Department of Medicine, Dr. Ruth E. Moulton of the Department of Psychiatry, Dr. Max Cohen of the Psychoanalytic Clinic for Training and Research, Professor Daniel P. Tausig of the Department of Anesthesiology, Dr. Stanley L. Lane, Professor Barnet M. Levy, Professor Lewis R. Stowe, Dr. James B. Campbell of the Department of Neurological Surgery, Dr. Charles T. Ryder of the Department of Orthopedic Surgery, and Professor Jules G. Waltner of the Department of Otolaryngology.

This wide range of interest and ability has made it possible for the Clinic to arrive at conclusions which may throw considerable light on the cause of facial pain as it relates to the temporomandibular joint.

A symposium was held in conjunction with the Department of Neurology on the subject of the differential diagnosis of maxillofacial pain. Professors H. Houston Merritt of the Department of Neurology, Stowe, Waltner, and Tausig and Dr. Cohen participated in this program.

DEPARTMENT OF DERMATOLOGY

Professor Carl T. Nelson, Executive Officer

The recent establishment of the laboratories of the Department of Dermatology as a single geographic unit within the Medical School building has proved to be a satisfactory arrangement. Unfortunately, there still has been no provision for ward beds and suitable office space for this Department in the Presbyterian Hospital. These long-standing deficiencies continue to hamper clinical research and teaching activities.

Changes in personnel within the Department of Dermatology during the past year include the appointment of Dr. Justina H. Hill, Dr. Margarita Silva Santiago, and Dr. Harvey Blank as Research Associates. Drs. William Curth and Helen O. Curth have been promoted from Instructors to Associates, and Drs. Milton B. Sloane, Anthony N. Domonkos, and Benjamin J. Chester have been advanced from the rank of Assistant to that of Instructor. Dr. Charles F. Post, who had been on leave of absence for duty in the United States Public Health Service, returned to the Department on July 1, 1952. Dr. Ralph Teicher was granted a leave of absence from November 1, 1952, to enter the Armed Forces of the United States. During the past academic year, three visiting scholars have been guests of the Department of Dermatology.

These included Dr. A. N. Roy from the Indian Institute for Medical Research, Calcutta, India; Dr. Haim Cohen from the Hadassah University Medical School in Israel; and Dr. Arturo Carrion from San Juan, Puerto Rico.

There have been no basic changes in the teaching program for undergraduate students. The arrangement which permits the fourth-year groups to spend two mornings each month at the United States Public Health Service Hospital, Stapleton, Staten Island, has been continued. These clinical sessions have been directed by Dr. Chester and have proven to be a valuable appendage to the undergraduate curriculum.

The training program for residents and graduate students in dermatology, organized in its present form by the late Professor J. Gardner Hopkins, has been continued. In addition to providing clinical experience and courses, the Department again held regular weekly seminars under Professors Paul Gross and Beatrice M. Kesten for the trainees. Special seminars and lectures were given in the Department during the past year by Dr. Carl B. Braestrup of the Department of Radiology; Professors Leonard T. Chavkin and Frederick D. Lascoff, Columbia University College of Pharmacy; Mr. George Gerung, Westinghouse Electric Corporation, New York City; Mr. John Reynolds, Picker X-Ray Corporation, New York City; and Dr. W. H. Ward, Newcastle, N.S.W., Australia.

A number of investigative projects, which reflect the varied interests of the members of the Department, have been in progress during the past year. Professor George C. Andrews has continued the long-term clinical appraisal of various methods employed in the treatment of angiomas and certain types of cutaneous malignancies. Professor Leslie P. Barker, in collaboration with Dr. Edward W. Wilson and Professor Carl T. Nelson, has completed a study on the value of derivatives of isonicotinic acid in the management of tuberculosis of the skin.

Professor Rhoda W. Benham and Dr. Silva have continued the investigation of the nutritional requirements of dermatophytes and have obtained data which show important relationships between the amino acid metabolism of these microorganisms and their virulence for laboratory animals as well as their pigment producing powers. Professor Benham has also initiated studies designed to delineate more clearly the criteria used for the identification of the yeast-like fungi and to test the possible pathogenicity of strains which have hitherto been considered harmless to man. Dr. Chester, working at the United States Public Health Service Hospital, Staten Island, has completed a study of the patterns of seroreversal which follow the treatment with penicillin of early and latent syphilis. Dr. Helen O. Curth has continued the investigation of the types of tumors which occur in association with acanthosis nigricans. As an extension of this work, a study of the genetic relationships observed in cases of acanthosis nigricans and ichthyosis hystrix has been started.

Professor Gross, in conjunction with Dr. Chester and Dr. Sloane, has con-

tinued the study of the pH and alkali neutralizing properties of the skin in various types of eczematous dermatoses. Professor Kesten has extended the investigation of the role of light sensitivity in certain dermatologic disorders and has also undertaken an appraisal of some of the newer compounds available for the treatment of onychomycosis. Professor J. Lowry Miller, with Drs. Hill, Marvin Brodey, Meyer Slatkin, and Harry L. Wechsler, has completed additional studies on the applications of the treponemal immobilization test in the diagnosis and management of syphilis. This work has provided further information on the specificity of the test, its significance in neurosyphilis, and its value in detecting biological false positive reactors to standard serological tests for syphilis. Data on the pattern of passive transfer of the immobilizing antibody from syphilitic mothers to nonsyphilitic offsprings have also been obtained. In collaboration with Miss Balbina Johnson of the Department of Surgery and Dr. Royal G. Jennings, Professor Miller has also initiated a study of the topical use of erythromycin in pyogenic infections of the skin.

Professor Nelson and Mrs. Julia M. Einbinder have continued investigating the effects of cortisone and related compounds on tissue electrolyte changes during anaphylaxis. Mrs. Einbinder, in conjunction with Professors Benham and Nelson, has also undertaken a study of the chemical structure of the capsular substance of C. neoformans. The object of this study is to investigate some of the factors which may be responsible for antigenic differences within this group of microorganisms. Dr. Wilson has been engaged in a study of the variations in amino acid metabolism and their possible relationship to the clinical course of psoriasis.

During the past year members of the Department have continued their participation in the activities of local, national, and international dermatological meetings. Professors Andrews, Kesten, and Miller and Dr. Helen Curth were speakers at the Tenth International Congress of Dermatology, held in London in July, 1952. These members of the staff, with Professors Barker and Nelson and Dr. Domonkos, also participated in the proceedings of the American Academy of Dermatology. Professors Benham and Gross and Drs. Silva, Slatkin, Hill, and Eugene F. Kelley, of the Department, delivered lectures in various hospitals and scientific meetings during the course of the academic year.

DEPARTMENT OF MEDICINE

Professor Robert F. Loeb, Executive Officer

There has been recently a strong resurgence of interest in medical curriculums and their implications in relation to the training of physicians. A number of medical educators and foundation administrators have stated that medicine is now in a "phase of transition" leaving an era which had "scien-

tific medicine as its objective and slogan, specialization as its dominant pattern, and the university medical center as its preferred instrument." They anticipate a third phase "which is now called comprehensive medicine" and feel that at long last attention is being focused on the patient as a whole.

It is gratifying to note that for almost forty years, in undergraduate training in internal medicine at Columbia, and in graduate intern and resident training in the Presbyterian Hospital, the "phase of transition" mentioned above has been in the process of evolving toward making the patient the focal point of attention. A social-service department was introduced at the Presbyterian Hospital in 1904 because it appeared clear at that time that socio-economic problems played an important role in the maintenance of health. In 1915 and 1916 routine follow-up clinics and a unit-history system were established because it was apparent that the "longitudinal" study and care of the patient through the years was of far greater importance than was episodic observation. In 1921 Professor George Draper introduced studies on the importance of constitution as a factor in health and disease and emphasized the "personality panel" as an integral part of the study of the patient. The latter concept received progressively greater emphasis—for almost twenty years, now, routine psychiatric instruction has been incorporated into the third-year clerkship in medicine in order that the student may understand the total individual and learn to recognize the relationship between emotions and disturbances of bodily functions. The importance of the impact of the socio-economic and other environmental factors upon the patient's health has been for years forcefully emphasized during the process of teaching the art of taking a discerning history. It has been felt that this impact is better appraised by the student with direct and intimate patient-physician relationship achieved through enlightened interviews rather than through home visits, which is currently advocated by some.

The group clinic was established seven years ago. Here the fourth-year student is introduced to the concept of group practice, in which the internist, i.e., the family physician, holds the key position, and in which he has immediate access to interdisciplinary relations with specialists whenever particular skills seem applicable to the patient's problems. Also, the increasing importance of the problems of chronic degenerative disease has been recognized for the past seventeen years at Columbia. Teaching in this area has been actively pursued in the Columbia Service of the Goldwater Memorial Hospital.

Criticisms are heard these days that in the education of the medical student, aspects of medical practice that are important to the family physician are being neglected and that the student is taught too much of that which he cannot apply in medical practice. These generalizations are rarely analyzed in terms of specific defects. If it is meant that physician-patient relationships are not stressed in the medical school, the accuracy of such a suggestion might be challenged, particularly because of the current emphasis in teaching the role

of emotions and of the opportunity afforded the student to study emotional influences in health and disease. Also, it might be pointed out that a physician's capacity for compassion, sympathy, and understanding is largely an inborn quality, modified, to a greater or lesser extent, by his environment, especially that of his early home and community. Reference is made to "short cuts": it would seem to represent a grave disorientation, in terms of relative values, to introduce such "short cuts" into the mature discipline of medicine. Short cuts can be best be taken on the basis of broad experience and even then only as a gamble justified by urgent necessity. Reference is also made to the teaching of the practicalities—it would seem that practicalities are certainly more appropriately and efficiently mastered in the face of full responsibility in graduate training and in the course of practice. The exercise of ingenuity in overcoming the handicaps met in peripheral practice is successful and safe only when based on a solid fundamental understanding gained in medical school. If it is meant that the student is taught in medical school to carry out procedures and programs too difficult to apply in practice, however important, then, obviously, the problem is not to change education, but to improve opportunities for sound practice in the community.

From the foregoing it seems clear that the undergraduate student in internal medicine at Columbia is not trained to be a "specialist." Rather, his orientation is directed toward those disciplines which *lay the groundwork* for his becoming a well-rounded internist, i.e., a family physician. That the technique of achieving this result may be improved is certain. In striving for this goal the Department of Medicine maintains a flexible attitude and a willingness to experiment with new approaches. The Department is convinced, however, that the end will not be served by sacrificing the already limited time for the study of the basic sciences and their integration with the study of disease mechanisms, the foundation for the advance of medicine in modern times. It is the Department's firm belief that in training the undergraduate student in medicine, the first and foremost consideration should be to expose the student to the basic disciplines of the science of medicine with an inculcation of austere critique such as can be acquired only in the atmosphere of a university school of medicine. Moreover, the Department is convinced that its aims will not be significantly furthered through home-care programs for medical students, premature application of the social sciences, or unfounded extension of preventive medicine, such as the prevention of hypertension by the education of members of "hypertensive families" to adjust better to their life situation.

The importance of improving medical care in the community is self-evident. Devices, including home-care programs for the indigent, the integration of medical and social agencies, increased opportunities for accuracy in diagnosis, the extension of public-health measures for the maintenance of health, and rehabilitation, urgently require further study and application.

These *community responsibilities* and activities will best be furthered by those graduates of medicine whose judgment stems from a thorough foundation in the basic medical sciences.

Professor Howard F. Shattuck retired, after many years of activity as Director of the Medical Service of Roosevelt Hospital and a teacher of undergraduate students in Medicine. Professor Bertram J. Sanger was promoted to Associate Clinical Professor as was Professor Arthur J. Patek, Jr., at Goldwater Memorial Hospital. Dr. Richard T. Cathcart resigned in order to become Assistant Professor of Medicine at Jefferson Medical College. Drs. Frederick K. Heath and Frederick T. Hatch resigned as Instructors in Medicine. Drs. Daniel L. Larson and Peter M. Dean are in the Armed Forces on leaves of absence. Drs. Samuel Dvoskin and Richard B. Duane have returned from military duty. The latter received a citation from the Surgeon General of the Army for meritorious service. It is with regret that the death of Dr. Edson B. Heck, Instructor in Medicine for more than twenty years, is reported.

A number of outstanding distinctions have come to various members of the Department in the past year. Professor J. Burns Amberson received the honorary degree of Sc.D. from the University of Pennsylvania. He was also made President of the Board of Trustees of Trudeau Sanitarium and delivered the Thayer Lectures at Johns Hopkins Medical School. Professor André Cournand gave the Annual Lecture of the Royal College of Physicians of Canada and was a guest of the Foreign Ministry of the West German Federal Republic. Dr. Henry Aranow lectured at the Postgraduate Medical School of London and at the Middlesex Hospital. Professor Alvin L. Barach lectured in Rio de Janiero, where a hospital has been named in his honor for his contributions to the treatment of diseases of the chest. Professor Stanley E. Bradley was appointed to the Board of Directors of the American Heart Association and delivered the Alpha Omega Alpha lecture at the University of the State of New York. Professor Alfred Gellhorn was elected to the Board of Directors of the American Association for Cancer Research. Professor Michael Heidelberger is Co-chairman of a Section at the Sixth International Congress for Microbiology, and delivered the Sigma Xi lecture at Yale. Professor Robert F. Loeb was awarded the degree of Doctor Honoris Causa by the University of Paris at the Sorbonne. Professor Irving M. London delivered the Alpha Omega Alpha address at Yale University. Professor Karl Meyer delivered the Claude Bernard Lecture at the University of Montreal and lectured before the Faraday Society of the University of Cambridge. Professor Gilbert M. Mudge presented a paper at the Potassium Symposium of the University of Minnesota. Professor George A. Perera participated in the Inter-American Cardiological Congress in Buenos Aires as representative of the American Heart Association. He also became a member of the editorial board

of *Circulation* and of the Council on High Blood Pressure Research of the American Heart Association. Professor Charles A. Ragan served as President of the New York Rheumatism Association, and is President of the American Rheumatism Association. He is also on the editorial board of the *Bulletin on Rheumatic Diseases*. Professor David Seegal delivered the Alpha Omega Alpha address at New York University. Professor John V. Taggart was awarded the Gibbs Memorial Prize of the New York Academy of Medicine for his studies on renal physiology.

No radical changes have been made in the teaching of internal medicine. However, Professor Dickinson W. Richards has been appointed as coordinator for instruction in cardiology and a number of the third-year lecture periods have been assigned to problems in cardiorespiratory disease and in studies of renal function. Lectures in the Department were given by Professor R. A. McCance of Cambridge, who delivered the Randolph West Memorial Lecture, Professor C. H. Stuart-Harris of Sheffield University, Professor John McMichael of London Postgraduate Medical School, and Professor Arnold D. Welch of Western Reserve University, who gave the Carter Lecture. A number of distinguished guests participated in the Saturday Combined Clinics. These included Drs. David P. Earle, Robert F. Pitts, William S. Tillett, Harold G. Wolff, Irving S. Wright, S. Bernard Wortis, and Seymour S. Kety. Drs. Nicholas B. Myant and Peter C. Reynell, Rockefeller Foundation Fellows from England, and Dr. Ronald W. Lamont-Havers, Fellow of the Canadian Arthritis and Rheumatism Society, as well as Fellows from the American Cancer Society, American Heart Association, Life Insurance Medical Research Fund, United States Public Health Service, Eli Lilly Foundation, John and Mary R. Markle Foundation, the National Medical Association, and the American Arthritis and Rheumatism Foundation have carried on work in the Department of Medicine during the past year.

The research activities of the Department have in the past year proven to be unusually productive and rewarding. Professor John V. Taggart and Dr. David Schachter have continued studies on certain biochemical features of kidney function. Because of the possible importance of Coenzyme A in tubular excretory mechanisms, various renal enzymes which utilize this coenzyme have been examined. In the course of this work, the benzoyl derivative of CoA was prepared by chemical means and was demonstrated to be the biological, energy-rich precursor of hippuric acid. The enzyme which catalyzes the interaction of benzoyl-CoA and glycine to form hippuric is now being purified; an approximately 25-fold purification has been achieved thus far. Other studies were concerned with the influence of renal electrolyte composition on the tubular excretion of p-aminohippurate. It was shown that the activity and stability of this anion transport mechanism are very dependent upon the maintenance of normal potassium and sodium levels in the kidney tissue. During the summer, observations on tubular excretory mechanisms in

the dogfish were undertaken at the Mt. Desert Island Biological Laboratory in Maine. Professor Gilbert H. Mudge has continued his studies on cellular mechanisms of electrolyte metabolism. In collaboration with Dr. Sidney W. Stanbury, Rockefeller Fellow from the University of Manchester, England, he demonstrated the feasibility of studying electrolyte transport in isolated cell-free systems of mitochondria. The initial studies disclosed a previously undescribed action of dinitrophenol—namely, apparent stimulation of phosphorylation noted in older work under slightly different experimental conditions. In collaboration with Dr. Hans W. Neuberg, the phosphorylated derivative has been identified as phospho-enol-pyruvate. Present evidence suggests that this ester may act as a specific carrier molecule in the transport of potassium. This hypothesis is being explored by means of more fundamental physico-chemical techniques. Of interest is the observation that in the mitochondrial system there are specific metabolic factors which differentiate between the transport of sodium and of potassium.

Professor Stanley E. Bradley, in collaboration with Drs. Paul Marks, Peter C. Reynell, and Jay Meltzer, has developed a method for measuring splanchnic blood volume by determining the local dilution of I^{131} labelled human serum albumin. It was found that Apresoline induces a striking increase in splanchnic blood volume in dogs. Acute hemorrhage was found to be followed by a reduction in splanchnic blood volume that appears to result from splanchnic vasoconstriction without significant local change in resistance to blood flow. In collaboration with Drs. Willoughby Lathem and Betty Roof, there have been completed studies of the acid-base excretion during the action of pressor drugs. Drs. Lathem and Roof and Professor Bradley, have also made a study of the decrease in protein and polyvinyl pyrollidone excretion during orthostasis in patients with proteinuria. A method of paper electrophoresis has been used to show the absence of change in urinary protein pattern under these circumstances. Mrs. Katherine Baker and Miss Barbara S. Jones have used this device to develop a method for the quantitative analysis of plasma albumin. Measurements of renal delay time have been continued with Dr. Edgar Leifer. No change in delay has been observed during anesthesia or surgical procedures in collaborative studies carried on by Professors Emanuel M. Papper of the Department of Anesthesia and David V. Habif of the Department of Surgery.

During the past year work has been continued by Professor Irving M. London in the fields of hemoglobin, protein, and lipid metabolism. Studies of the mechanisms involved in heme synthesis and on factors in the erythrocyte, in plasma, and in other natural sources which influence this synthesis have been pursued in association with Dr. Elhanan Dimant. The formation of hemoglobin is under study in an in vitro system of immature avian erythrocytes, in collaboration with Dr. Nicholas B. Myant. In collaboration with Dr. Dimant, the metabolism of glutathione in mammalian and avian erythrocytes

is being investigated. Further studies on the lipids of the erythrocyte, which are being carried out jointly with Dr. Haiyim Schwartz and Dr. Philip Aisen, confirm the earlier findings that cholesterol of erythrocytes is derived from the cholesterol of plasma and indicate more complex relationships between the phospholipids of the erythrocytes and those of plasma. In collaboration with Dr. Schwartz, a study on the mechanism of maintenance of hypercholesterolemia in xanthomatosis tuberosum multiplex has shown a prolonged survival time for serum cholesterol. In association with Dr. Helen M. Ranney, studies on the capacity of mammalian tissues to form antibody in vitro are being continued. During the past year Dr. Richard J. Cross has been concerned with studies of the metabolism of ketone bodies. The oxidation and renal excretion of these compounds have been investigated using trained dogs which were given infusions of sodium acetoacetate alone and in combination with other substrates. More recently the chief emphasis has been on studies of factors affecting the synthesis of ketone bodies. These studies have been carried out using whole homogenates, washed homogenates, and tissue slices prepared from rat and rabbit livers. The effects on acetoacetate formation of such factors as pH, molarity, trace elements, coenzymes, choice of substrate, etc., have been thoroughly investigated. A satisfactory, reproducible system for the in vitro formation of ketone bodies has been found. Under way now are studies of how this formation is influenced by such factors as the previous dietary history of the animal, species differences, and a number of hormones. Professor Joseph C. Turner, in studying nutrition in Daphnia, has come upon strains of bacteria which use salicylate as nutrient. The metabolism of salicylate by these microorganisms is being studied in detail, with the ultimate objective being the application of the findings to the elucidation of the mode of action of salicylate and related compounds in man.

Professor Karl Meyer and his associates have continued work on isolation and characterization of components of connective tissues and their enzymatic breakdown. Dr. Bernard Weissmann, in an analysis of the breakdown of hyaluronic acid by testicular hyaluronidase, has isolated a homologous series of oligosaccharides. Study of the action of the enzyme on individual oligosaccharides has led to the finding that the hydrolytic activity is accompanied by a synthetic process. Hyaluronidase is, therefore, a transglycosidase which transfers disaccharide units or multiples thereof. In collaboration with Mr. Alfred Linker, two distinct types of hyaluronidases, the bacterial type and the animal type, were demonstrated. The bacterial hyaluronidases, on hydrolysis of hexosaminidic bonds, cause a profound change of the basic disaccharide units into a group modified from the repeating unit of the original molecule. Similar changes are observed with hydrolysis products of chondroitin sulfate. Dr. Weissmann, Mr. Eugene A. Davidson, and Professor Meyer have begun a study of the structure of chondroitin sulfate A. Professor Meyer, Mr. Linker, and Mr. Davidson have isolated and characterized three mucopoly-

saccharides of the cornea, among which is a newly discovered type of sulfated mucopolysaccharide, composed of glucosamine, acetyl, and sulfate.

In collaboration with Dr. Otto J. Plescia and Mr. Myron A. Leon, the study of a reagent-lacking second component of complement has been continued by Professor Michael Heidelberger. This reagent was shown to accelerate hemolysis at various dilutions and to inhibit at high concentration. Mr. Harold Markowitz has completed studies on the specific polysaccharide of Type 18 pneumococcus and on the effect of covering various chemical groupings in the Type 3 polysaccharide. In an already degraded sample of the latter, acetylation of all hydroxyl groups abolished precipitation of antibodies by the polysaccharide, but the power to precipitate was recovered in proportion to the removal of the acetyl groups by alkali. An ungraded sample was partly degraded by the above cyclic process. The Type 18 polysaccharide consists of about 75 per cent glucose, 15 per cent rhamose, and 10 per cent secondary or tertiary phosphate which possibly binds some of the sugar residues together or forms cross linkages. Mr. Arnold B. Powell has coupled iodoacetamide with crystalline egg albumin, most probably through the -SH groups, without any demonstrable effect on the immunological specificity of the protein. He is now preparing iodo-amides with larger substituents to find out whether or not these show a similar effect. Professor Heidelberger, with the help of Dr. Alan C. Aisenberg, has extended his studies of synthetic polyglucoses. Various fractions show differing immunological reactivity. From the chemical linkages involved, the surmise was made that glycogen and amylopectin should react with certain antisera, and that these reactions were actually found to take place. A large field of study which relate chemical constitution to immunological reactivity is opened by these observations. With Drs. Elliott Middleton and Plescia the factor in mouse milk concerned with mammary carcinoma, obtained through Professor Samuel Graff of the Department of Biochemistry, has been fractionated by electrophoresis and electrophoresis-convection. The serological properties of the fractions are being studied.

Dr. Robert S. Gordon has studied immunochemically the serum from a patient with acquired hemolytic anemia associated with cold agglutination. The agglutinin was purified by absorption onto stromata: the resulting preparation appeared to be over 50 per cent agglutinin. This protein was characterized in the ultracentrifuge and electrophoretically, and immunochemical comparison between it and normal serum gamma globulin was carried out. Finally, quantitative studies of its interaction with washed erythrocyte stromata were performed. Dr. Daniel L. Larson completed studies on the ability of patients with leukemia and allied disorders to form antibodies. Patients with acute leukemia formed unusually large amounts of antibody, and this response was somewhat impaired in patients with acute leukemia receiving cortisone. Patients with chronic lymphatic leukemia and with multiple myeloma formed

little or no antibody. Patients with chronic myeloid leukemia, lymphosarcoma, and Hodgkin's disease had antibody responses essentially within the normal range. In collaboration with Dr. Helen M. Ranney, Dr. Larson developed a method for the qualitative, semiquantitative, and quantitative estimation of normal and abnormal hemoglobins using filter-paper electrophoresis. Studies of families on the occurrence of abnormal hemoglobins were carried out and clinical and genetic information was obtained on the gene for sickling and the gene for hemoglobin C disease. A homozygous hemoglobin C patient was discovered, and the protein was defined by electrophoretic mobility, ultraviolet absorption spectrum, solubility, and sedimentation constant. During the past year Professor William B. Sherman, in cooperation with Mr. Joseph Portnoy of the Department of Microbiology, has completed the study of the determination of blocking antibody in ragweed-sensitive patients. These studies show that the blocking antibody in patients treated with injections of ragweed-pollen extract can be demonstrated by its action in inhibiting the fixation of complement by a ragweed-rabbit anti-rag-weed serum system. This is of some interest, since the usual method of demonstrating blocking antibody previously has involved experiments carried out in normal human skin by modifications of the Prausnitz-Küstner reaction. However, its practical value is limited in that the complement fixation method proves to be less sensitive than the passive transfer method. The reaction is highly specific and has all the usual features of an antigen-antibody reaction. The Allergy Clinic has also been cooperating in a study of the pollens of Southern Florida which are causative agents in hay fever. Pollens have been collected by the Department of Botany of the University of Miami and extracts of them made in the Allergy Laboratory for testing by physicians practicing in Southern Florida.

Dr. Edward E. Fischel, with Professor Elvin A. Kabat of the Department of Microbiology and Dr. Herbert C. Stoerk of the Merck Institute, demonstrated that large doses of cortisone result in a striking diminution of antibody production and granuloma formation at the site of antigen-adjuvant deposition. Cortisone administration appears to have the same overall effect as does omission of tubercle bacilli from the antigen-adjuvant emulsion. With Dr. Charles W. Frank, appraisal of the management of the acute phase of rheumatic fever with cortisone, ACTH, and salicylate has continued as a part of the Cooperative Study of the American Heart Association and the British Medical Research Council. At present, no substantial differences are definable among the three treatment groups, but follow-up studies are being continued. Laboratory studies on chemical phenomena associated with inflammation continue. In myocardial infarction, increased serum complement is a useful aid in the differentiation of infarct from angina and in the detection of recurrent episodes of infarction. A comparison of several indices of in-

flammation is being carried out in a variety of conditions using the ESR, serum complement, and the C-reactive protein test.

Professors Charles A. Ragan, Ralph H. Boots, and their associates have extended their observations on the effects of cortisone and ACTH administered over prolonged periods of time to patients with rheumatoid arthritis and disseminated lupus. It now appears that an intensified form of rheumatoid arthritis may follow prolonged hormonal therapy. Professor Ragan has published a report on the natural history of disseminated lupus: it appears that the prognosis may be considerably better in certain patients than was formerly believed to be the case. In collaboration with Professor Raphaele Lattes of the Department of Surgery, Professor Ragan has extended studies on the effect of cortisone on connective tissues. Dr. Lamont-Havers, working in the Department of Microbiology laboratories, has continued observations on the nature of the factor responsible for the agglutination of sensitized sheep cells by sera from patients with rheumatoid arthritis. This appears to be a component of the gamma globulin fraction. The streptococcus agglutination requires this same factor but in addition requires a component of normal serum.

Professor Abbie I. Knowlton and Dr. Emily N. Loeb, in conjunction with Dr. Herbert C. Stoerk, are extending studies of adrenal steroids. The influence of these steroids singly and in varying combinations upon growth, blood pressure, serum electrolytes, and cardiac and renal size in adrenalectomized rats on sodium restriction has been observed. Doses of DCA alone over a range of 0.005 to 1.25 mg. progressively enhanced growth, whereas similar amounts of cortisone acetate uniformly led to weight loss. With combinations of the two steroids, doses of cortisone acetate in excess of 0.32 mg. daily interfered with the characteristic growth-promoting effect of DCA. With DCA alone serum sodium levels rose with increasing doses to assume normal levels at 0.08 mg. and above per day, while with cortisone acetate no effect upon serum sodium levels was observed until daily doses of 1.25 mg. were given. At this and higher levels normal values were obtained. With combinations of the two steroids the DCA effect predominated. With increasing amounts of DCA alone the blood pressure levels reached a low normal range at doses of 0.08 mg. daily and remained in the normal range despite daily doses as high as 2.5 mg. With a similar range of dosage of cortisone acetate, normal values were not observed until a daily dosage of 0.32 mg. was given, and with further increases in dosage progressively severe hypertension appeared. With DCA and cortisone acetate in combination the hypertensive effects of the latter were predominant.

Professor Sidney C. Werner has adduced evidence suggesting that Graves' disease is not mediated through the anterior pituitary. This has been shown by responses of the over-active thyroid to thyrotopin, thyroid extract, and

triiodothyronine and the responses of the treated and euthyroid patient to the first two of these agents. Professor Werner has demonstrated also that repeated diagnostic tests of I^{131} have a threapeutic effect upon hyperthyroidism. The total dose thus provided is not in excess of that customarily used to follow the course of the disease under the influence of a therapeutic agent, and three sustained remissions in children have resulted from this procedure. The importance of the observation in investigating this disease is evident. A study of triiodothyronine in untreated myxedema has been made by Professor Werner, and a comparison has been made with l-thyroxin. Not only does triiodothyronine act within twelve hours but a euthyroid state can be achieved while the serum iodine level fails to rise. It takes from 6 to 9 days for l-thyroxin to act, and a sharp rise in the serum iodine level is caused. Triiodothyronine labelled with I^{131} has been given and its distribution studied. Professor Werner has also used ACTH and cortisone effectively in the treatment of acute non-suppurative thyroiditis.

On the basis of extensive studies of patients with congenital adrenal hyperplasia, Professor Joseph W. Jailer and Dr. Jay J. Gold, working in the laboratories of the Department of Obstetrics and Gynecology, have developed the view that these patients suffer from an inborn error in the adrenal synthesis of compound F. It appears as though there were an enzymatic defect by virtue of which the synthesis of compound F from 17-hydroxy-progesterone is impaired, and the latter is degraded to androsterone and etiocholanolone which are responsible for virilism. Professor Jailer with Professor Knowlton has found evidence that a guide to the differentiation of adrenal hyperplasia and adrenal tumors may be obtained in the difference in the urinary excretion of 17-keto-steroids in the two disorders following cortisone administration.

During the past year Professor George A. Perera has continued studies on hypertensive vascular disease, adding to the large body of data which he has accumulated on its natural history and conducting clinical trials with many of the newer hypotensive agents including protoveratrine, l-hydrazinophthalazine, and rauwolfia serpentina. Studies with massive vitamin C therapy and dehydroisoandrosterone (aimed at modification of steroid metabolism) and with benemid (which modifies the excretion of 17-ketosteroids) were unsuccessful in altering blood pressure levels. Confirming previous reports of animal studies, it was shown that the restriction of dietary potassium in patients with essential hypertension is followed by small but significant decreases in blood pressure, that sodium retention accompanies this restriction, and that low potassium diets block the pressor response to desoxycorticosterone. In collaboration with Professor Robert C. Darling of the Department of Physical Medicine and Rehabilitation and Professor Paul A. di Sant'Agnese of the Department of Pediatrics, a disturbance in the excretion of sweat electrolytes in fibrocystic disease of the pancreas was described and studied. The evidence suggests that the cause of the excessive salt loss in the sweat in this

condition lies in the sweat glands themselves, a new site for abnormality in this condition. Drs. Marcel Goldenberg and Irving Serlin have extended studies on the diagnosis of pheochromocytoma with the chemical methods of chromatography and fluorometry on the urine.

Dr. John W. West, with Professor Dickinson W. Richards and Dr. John A. Wood, carried on studies on the mechanism of dyspnea in ambulatory patients with chronic valvular heart disease which have led to the conclusion that exertional dyspnea in these patients is not due simply to diminished breathing reserve as measured in terms of minute volume. Factors relating to fatigue, effort in breathing, and perhaps to stretch receptors with the lungs are possibly of some importance in this connection but in a manner as yet unknown. The studies by Dr. West, in collaboration with Professor Paul A. di Sant'Agnese of the Department of Pediatrics, of pulmonary function in patients with cystic fibrosis of the pancreas have led to the recognition of a pattern of dysfunction in this disease which resembles pulmonary emphysema in many respects. In collaboration with Dr. James K. Alexander, studies on the ventilatory response to carbon dioxide inhalation under various conditions of health and disease have been initiated. Preliminary observations indicate that chronic respiratory acidosis exerts a deleterious effect upon the sensitivity of the respiratory center to both the carbon dioxide and hydrogen ion stimulus while chronic arterial anoxia does not.

Professor René Wégria, with Drs. Charles W. Frank, Donald M. Kanter, Hsue-hwa Wang, and James Golub, has studied the effects of various tachycardias on cardiac output, coronary flow, and mean arterial pressure in dogs. They have also studied intercoronary reflexes and find no decrease in flow in the remaining two main arteries when the third is suddenly occluded, indicating there is no intercoronary reflex in the dog. This group also established that increase in the work of the right ventricle induced by an increase in the pulmonary artery pressure leads to an increase in the coronary sinus outflow.

A portable device combining exsufflation with negative pressure was developed by Professor Barach in collaboration with Dr. Gustav J. Beck and Mr. William H. Smith. A new principle of mechanically induced "coughing" was based on the production of expiratory flow-rates 2 to 3 times higher than those of patients with respiratory difficulties, and surpassing those of maximal effort in normal individuals. With this new device clinical improvement, including the clearing of pulmonary atalectasis in 8 cases of poliomyelitis and 1 of bronchial asthma, was manifested in 36 of 39 cases. Methods of mechanically induced cough have resulted in clinical benefit in all but 8 of a total of 136 cases during the past 3 years. In collaboration with Dr. Hylan A. Bickerman, studies on the treatment of pulmonary emphysema and bronchial asthma included the use of antibiotic drugs, cortisone, and ACTH, and physiologically directed procedures. Of special interest has been the increasing recognition that some degree of diaphragmatic breathing may be instituted in the majority

of patients with severe pulmonary emphysema with marked increase in efficiency of ventilation of the lower lobes of the lungs, demonstrated by decrease in the volume of breathing and a more efficient exchange of oxygen and carbon dioxide. Studies on the use of various antibiotics in chronic respiratory infection have been continued.

Professor Robert L. Levy, with Professor Darling, Dr. John H. Laragh, and Dr. Nicholas E. Capeci, has been making studies with a four-lead electrocardiograph to compare effects of walking on a treadmill, the anoxemia test, and the "two step" test for coronary artery disease. He has been studying the effectiveness of a new coronary vasodilator, Praenitrona.

During the past year Mrs. Katherine M. Price, in the laboratory of Professor Yale Kneeland, has continued her studies of the effect of broad spectrum antibiotics on feline pneumonitis virus, with particular reference to an alteration in staining reaction of elementary bodies, and more precise definition of the amount of antibiotic and the number of egg passages before the virus is completely eliminated. In addition, she has studied a mucoid variant of staphylococcus aureus with an adapted strain in influenza virus. Not only is this staphylococcus mucoid and encapsulated, but it has the capacity of agglutinating red blood cells. Rabbit antiserum produces specific capsular swelling, a finding not previously described.

The following studies relating to problems of malignancy have been carried out by Professor Gellhorn, Dr. Erich Hirschberg, and Dr. Jack D. Davidson. The growth-inhibitory activity of 1,4-dimenthanesulfonyloxybutane has been determined on a variety of tumors in experimental animals. Significant inhibition of several mouse mammary adenocarcinomas and an undifferentiated squamous cell cancer in rabbits was noted. Studies on the mechanism of action of the compound have shown an accumulation of desoxyribose nucleic acid and ribose nucleic acid in the inhibited tumor cells and no demonstrable depression of radiophosphorus incorporation into the nucleotides of the nucleic acids. On the basis of other observations made in this laboratory, this indicates an effect of the drug on nucleic acid utilization rather than on nucleic acid synthesis. In collaboration with Professor Margaret R. Murray LeDoux of the Department of Anatomy, in vitro studies of the effect of the purine analog, 8-azaquanine, on human glioblastoma multiforme have been completed. The significant cytotoxic effect on malignant brain tumor cells was correlated with a low cellular concentration of the detoxifying enzyme previously described in this laboratory. Clinical evaluations of dihydrotestosterone in breast cancer, 6-mercaptopurine in multiple myeloma and reticulum cell sarcoma, and 1,4-dimethanesulfonyloxybutane in a variety of malignant diseases have been in progress. Of particular interest was the attempt to correlate the therapeutic activity of the latter drug in human disease with the results obtained against experimental tumors.

Professor Charles A. Flood has been evaluating the significance of eso-

phageal reflux in the production of esophagitis in patients with hiatus hernia, and, in collaboration with Dr. Michael J. Lepore and the medical-psychiatric group, studies of the natural history of ulcerative colitis are being continued. Dr. Calvin H. Plimpton has been continuing studies on the effects of acidosis and of cortisone on bones. Dr. Stuart W. Cosgriff, with Dr. John L. Decker, has developed and evaluated a practical and effective program of combined dicumarol and tromexem therapy. Dr. Isador Mufson continues the studies on peripheral vascular disease. Dr. Henry Aranow is carrying on clinical studies on the control of myasthenia gravis. Professor Kenneth B. Turner has continued his studies of the cholesterol esterifying enzyme in human serum.

Professor William H. Sheldon has collected more material for his atlas on the somatotyping of women. In collaboration with Drs. Albert Damon and Sylvia G. Traube, somatotypic distribution for normal colored and white females in the Vanderbilt Clinic has been plotted for comparison with a similar population exhibiting various disease states. With Mr. Richard H. Osborne, Drs. Damon and Traube have been collecting detailed anthropological, genetic, and medical data on large series of twins.

The Research Service at the Goldwater Memorial Hospital is now in its seventeenth year as an affiliated unit, engaged in the study of chronic disease. During this period 354 fourth-year students have served here as clinical clerks and substitute interns to become indoctrinated in the problems and management of protracted disease. In the past year the student group has included individuals from the University of Virginia, University of Kansas, and Harvard University. An expanded research program has been made possible by the addition of the City Home Laboratory to the Columbia facilities.

Professor Forrest E. Kendall of the Department of Biochemistry and Professor Margaret Bevans of the Department of Pathology have found that the rate of regression of experimentally induced canine arteriosclerosis is not influenced by the individual administration of either choline, inositol, thyroid hormone, thiouracil, or cholesterol. In the course of his studies on the metabolism of cholesterol, Dr. Erwin H. Mosbach of the Department of Biochemistry has developed methods for the separation and estimation of the bile acids by column partition chromatography. Dr. Seymour Dayton is studying the metabolism of continuously infused radioactive acetate in the rat with particular reference to the influence of dietary and hormonal factors on the rates of lipogenesis. Dr. Frederick T. Hatch and Dr. Liese L. Abell of the Department of Biochemistry and Professor Kendall have found that the fall in serum cholesterol level observed in hypertensive patients on a low-fat, high carbohydrate diet is accompanied by a marked increase in the level of the serum neutral fat. Professor Alfred Steiner, Dr. Henry E. Payson, and Professor Kendall are investigating the effect of estrogenic substances upon the serum-lipid pattern of normal individuals and patients with evidence of a past myocardial infarction. In a cooperative study with the Public Health Research

Institute of the City of New York, Inc., Professor Dewitt Stetten, Jr., Mrs. Jean D. Benedict, Dr. Louis A. Scarrone, and Professor Arthur R. Wertheim are utilizing N^{15} labelled glycine to study the relation of creatinuria to muscle mass in a variety of clinical conditions.

Professor Wertheim, with the late Professor John D. Lyttle of the Department of Pediatrics, Dr. Emily N. Loeb, Dr. David P. Earle, Jr., Professor Beatrice C. Seegal of the Department of Microbiology, and Professor David Seegal, have reported on the association of Type 12 specific hemolytic streptococcal infections with acute glomerulonephritis. Their data indicate that the Type 12 hemolytic streptococcus was the most common incitant of acute glomerulonephritis in a group of 39 patients studied from 1936 to 1942. Professor B. C. Seegal, Miss Mollie Saltzman, and Professor D. Seegal are investigating the specificity of an antigen which they have obtained from a Type 12 hemolytic streptococcus.

As part of a study on glucose tolerance in patients with primary hypertension, Professor Wertheim and Dr. Gerald H. Eurman have found that patients with this disease so tested have less of a fall in serum inorganic phosphorous than do normotensive controls. Professor Wertheim, in collaboration with Drs. Eurman, Hatch, Albert J. Stunkard, and Morton Wachspress, continues to find that a moderately palatable diet containing 90 gm. protein, 55 gm. fat, 320 gm. carbohydrate, and up to 4 mEq of sodium is as effective as the Kempner rice diet in lowering the blood pressure of some hypertensive patients. The effects of certain drugs on hypertensive vascular disease are being investigated. Dr. Arthur R. Schulert of the Department of Biochemistry has joined the Service to determine the physiological disposition of some of these drugs. Dr. Milton Mendlowitz and Dr. Eurman have demonstrated the accuracy and limitations of using the mouth temperature as an index of digital arterial blood temperature. Their findings support the validity of blood flow determinations by the calorimetric technique. Dr. Eurman and Dr. Mendlowitz utilized this method to study the effects of either prolonged sodium depletion or the administration of some hypotensive drugs on the digital vascular resistance in primary hypertension. The low sodium regimen increased intrinsic calibre, decreased intrinsic blood flow, or did both without producing a signficant or consistent effect on the neurogenic component of the vaso-constriction. In contrast, the major effect of the drugs (hemamethonium and 1-hydrazinophthalazine) was inhibition of neurogenic vasoconstriction.

Professor Beatrice C. Seegal and Bevans are continuing their study on the lesions produced by specific anti-kidney and anti-placental sera in the rat and dog. An attempt is being made to produce arteriosclerosis in the rat by feeding cholesterol and thiouracil to rats with cytotoxic nephritis. In collaboration with Dr. Ernest Schmatolla and Professor Arthur J. Patek, Jr., Professor Bevans has carried out preliminary morphological studies which have in-

dicated that certain amino-acid mixtures are as efficacious as high levels of casein intake for the repair of induced nutritional cirrhosis in the rat. Professor Ragan, Dr. Felix E. Demartini, and Dr. Lamont-Havers have utilized the facilities of the Research Service for part of their studies on the prolonged treatment of patients with rheumatoid arthritis. With Professor Bevans they have studied the osteoporosis related to prolonged ACTH and cortisone therapy. Dr. Henry A. Lax, Dr. Arthur W. Feinberg, and Mr. James Blake are continuing their studies on the usefulness of a strain gauge transducer vasculograph for the detection of early peripheral arteriosclerosis in man and dog. Dr. Henry Colcher, in collaboration with the Gastrointestinal Laboratory of the Mount Sinai Hospital, is investigating factors affecting the appearance of various electrolytes in the gastric juice of man and dog. Dr. Judith Nadell has reported on the effects of the carbonic anydrase inhibitor "6063" on electrolyte and acid base balance in normal individuals and patients with respiratory acidosis. Both groups experienced transitory sodium, potassium, and bicarbonate diuresis on administration of the drug. Its continued administration produced a lowered plasma CO_2 and pH. The possible usefulness of this drug in the therapy of patients with hypertension is under investigation.

At Bellevue Hospital the study of antimicrobial agents for tuberculosis has continued under Professor J. Burns Amberson and Drs. Bettina B. Garthwaite and Henry G. Schaffeld. The limited place of viomycin in therapy was defined. Isoniazid, alone and in combination with other drugs, has been appraised. Effects of drugs on the course of tuberculosis is being correlated with changes in respiratory function; and, in conjunction with Professor Marvin Kuschner of the Department of Pathology, correlations of drug effect and histopathological changes are being carried out. Professor Julia M. Jones is continuing her long-term study of the development and course of tuberculosis in nurses at Bellevue Hospital. Professor M. Irené Ferrer and Dr. Réjane M. Harvey, with Professor André Cournand, have continued their studies of the effects of acute and full digitalization and of exercise in patients with different types of heart disease, in congestive heart failure and after return to compensation. They have also been interested in investigating patients with rheumatic heart disease with particular reference to suitability for, and short- and long-term evaluation of surgical intervention in mitral stenosis. A group of patients who combine mitral stenosis with myocardial insufficiency has been isolated—little or no benefit was derived by them from surgery. Dr. Alfred P. Fishman and Dr. Philip Samet have investigated the variations of blood volume in congestive heart failure caused by all types of cardiac disease. In this study, they have measured separately and simultaneously the red blood cell volume and the plasma volume, using the tagged red cell (P_{32}) and the dye (T-1824) methods, respectively. Contrary to some recently published data, they have found that the red blood cell and plasma

volumes are often, in congestive heart failure, significantly larger than in normal subjects, and that after return to compensation, both volumes may be markedly reduced, although they seldom return to normal.

Professors Cournand and M. Irené Ferrer, in collaboration with Drs. Réjane M. Harvey and A. Gregory Jameson, have compared the effects of various types of mechanical respirators in the treatment of chronic pulmonary emphysema with hypercapnea and anoxia. Dr. Fishman and Dr. Samet, in this same group of patients, have noted a lack of significant response of ventilation to high concentrations of respired CO_2 persisting even after the alkaline reserve and the carbon dioxide tension in arterial blood have returned to a nearly normal level. In the course of these studies, they have investigated, in collaboration with Dr. Aaron Himmelstein, the effects of breathing a mixture of air and carbon dioxide upon the dynamics of the circulation. Dr. William A. Briscoe has made interesting observations concerning the problem of ventilation-perfusion relationship in different parts of the lungs, using the helium wash-out method in combination with the measurement of arterial blood oxygen saturation. The "work of breathing," as reflected by the oxygen consumption at various levels of ventilation under resting conditions, has been investigated by Drs. Mortimer and Richard Bader in normal subjects and in patients with chronic pulmonary and cardiac diseases. They were able to attain very high levels of ventilation without acapnea in combining voluntary hyperventilation with the breathing of a mixture of air and CO_2.

DEPARTMENT OF MICROBIOLOGY

Professor Harry M. Rose, Executive Officer

During the year, 11 graduate students under the Faculty of Pure Science were registered in the Department and 1 completed the requirements for the Ph.D. degree. The program of graduate instruction was enlarged to include a course in advanced microbiology, under the direction of Professor John D. MacLennan, and a series of weekly teaching seminars, in which the discussions were led by both graduate students and members of the staff, was undertaken.

Dr. Leon Dmochowski, Department of Experimental Pathology and Cancer Research, University of Leeds, England, was appointed Visiting Associate Professor, effective February 1, 1953. Professor Dmochowski is well known for his work on the etiologic relation of virus-like agents to certain neoplastic diseases of rodents, and his appointment indicates the interest in viruses as causative agents of cancer which will henceforth be pursued by the Department.

Dr. Bernard F. Erlanger was appointed Associate. Dr. Erlanger is a biochemist, and his appointment signals the beginning of a development which

is designed to improve the ability of the Department to conduct research at a more fundamental level and to widen the base of its instructional program in bacterial metabolism and genetics as well as the nature of viruses and the mechanisms whereby they invade cells, undergo multiplication, and cause disease.

Professor Elvin A. Kabat was on sabbatical leave until March 1, 1953. During his leave he conducted investigative work on structural carbohydrate chemistry in the laboratory of Professor Hermann O. L. Fischer, University of California, Berkeley, and gave lectures and seminars at the Naval Biological Laboratories and the Naval Radiological Defense Laboratories, San Francisco, at Stanford University, and at the University of California. While traveling homeward he lectured at the University of Texas, Galveston, and at the Medical College of Virginia, Richmond.

The laboratories of the diagnostic service performed 65,554 examinations of which 28,070 were serologic tests for syphilis. This is an all-time record which reflects the general increase in services rendered by the clinical departments and the constantly mounting—indeed, often lavish—use of laboratory procedures in the care of patients. As a consequence, however—if the upward trend continues—it will soon be necessary to remodel and enlarge the diagnostic laboratories and to employ additional technical personnel in order that both volume and quality of work may be maintained. It may be pointed out that there have been no major improvements in the facilities of the diagnostic service since the Medical Center began operations twenty-five years ago and that many items of equipment installed at that time should be replaced now because they are either worn out or obsolescent.

Professor Harry M. Rose extended his work on antiviral substances which occur in secretions of the human respiratory tract and, in collaboration with Professor Dan H. Moore, Department of Anatomy, conducted electronmicroscopic studies of viruses in infected tissues.

Professor Claus W. Jungeblut continued his studies on poliomyelitis. Investigation of the presence of viremia in human poliomyelitis led to the isolation of a strain of poliomyelitis virus (Brunhilde type) from the blood of a pregnant woman, shortly after the onset of paralysis. Experiments undertaken in collaboration with Dr. Joseph E. Verlinde and Dr. Dartheld Hofman, Jr., of Leiden, Netherlands, showed that poliomyelitis virus—Leon strain—is capable of being adsorbed in vitro onto human O erythrocytes. Studies, carried out with Dr. Alice W. Knox, demonstrated the presence in human saliva of a heat-labile factor which renders human O cells panagglutinable and inhibits their hemagglutination by Col-SK virus. This factor was found more frequently and more consistently in saliva collected from poliomyelitis patients during the acute stage of the disease than in saliva from healthy individuals. Dr. Beni Horvath completed his studies on electrostatic forces involved in the Col-SK hemagglutination phenomenon.

Professor Beatrice C. Seegal and Professor Margaret Bevans of the Department of Pathology continued clinicopathologic studies on glomerulonephritis produced in dogs and rats by the injection of specific antiplacenta or antikidney serum. The counterpart of the nephrotic syndrome in man has been produced in rats by the injection of rabbit antirat kidney serum. This syndrome may develop within 24 hours after injecting the serum and affords an opportunity to observe histopathologic sequences unobtainable in man. An attempt is being made to produce arteriosclerosis in nephritic rats by feeding them cholesterol and thiouracil. Professor Beatrice C. Seegal and Professor David Seegal of the Department of Medicine, with others, have reported upon the preponderance of Type 12 hemolytic streptococcus infections preceding acute glomerular nephritis in 39 cases seen in New York City from 1936 to 1942. They are investigating the specificity of an antigen derived from Type 12 hemolytic streptococcus.

Professor John D. MacLennan continued his studies on the proteolytic enzymes of *Clostridium histolyticum*. Evidence has been obtained for the existence of a fourth enzyme, possibly a peptidase, and a method—suitable for commercial production—has been devised for the purification of one of the proteinases previously identified. It is anticipated that sufficient material will shortly be available for a large-scale clinical trial of this enzyme in the débridement of burns and other necrotic lesions. Work was continued on the isolation and purification of *Cl. histolyticum* collagenase, and Professor MacLennan's investigations in this field over the past three and one-half years are now being prepared for publication. Professor MacLennan has also undertaken a study of the production of mucolytic enzymes by microorganisms.

Dr. Margaret Holden, in collaboration with Professor Beatrice C. Seegal, continued studies of the effect of cortisone on different cell systems propagated in tissue culture. Since the data already gathered have indicated that cortisone can be toxic in minute amounts to cultured cells, work has been extended to examine the effect of cortisone on mitosis and phagocytic activity of single cell types. The action of cortisone on bacterial growth is also being tested.

Dr. Robert H. Muller continued studies on the concentration and partial purification of several viruses by means of ion exchange resins. The method previously developed for the concentration of the PR8 strain of influenza virus was found inapplicable to the concentration of the Lee strain of influenza virus, mumps virus, and herpes simplex virus. A method was devised which uses an anion, rather than a cation exchange resin, for the concentration of the Lee strain of influenza virus. Information obtained in the course of these experiments on the adsorption of virus particles to resin surfaces may be of value in studying the mechanism involved in the combination of viruses and host cells.

Dr. Calderon Howe, in collaboration with Professor Kabat, extended his studies of the degradation of blood group substances by marine snail enzymes.

He also carried out preliminary investigations on bacterial enzymes and found that these may be a good source of carbohydrases to apply to further studies on the structure of blood group substances. In collaboration with Professor Rose and Dr. Erlanger, Dr. Howe undertook chemical analyses on various sputum fractions with particular reference to their content of blood group substances and the relationship of these polysaccharides to the factors which inhibit influenza virus hemagglutination and influenza infection in embryonated hens' eggs.

Dr. Bernard F. Erlanger conducted studies on the isolation and characterization of an antiviral substance of human sputum in collaboration with Professor Rose. Chromatographic and zone electrophoretic techniques were utilized, the latter showing excellent potentialities. Dr. Erlanger also investigated the interaction between the influenza virus and certain synthetic polypeptides and carried out preliminary experiments on the possible antiviral and antibacterial effects of polypeptides. In addition, Dr. Erlanger collaborated with Dr. Solon A. Ellison and Mr. Peter Allen in studies concerning the mechanism of photoreactivation in bacteria.

Dr. Ellison continued serologic studies of infections with the virus of herpes simplex. A study of the transplacental transmission of antibody to this virus was completed. Experiments were performed to explore the usefulness of the complement-fixation inhibition test, employing chicken antisera, in the identification of virus strains. Together with Dr. Erlanger and Mr. Allen, Dr. Ellison investigated the mechanism of the photoreversal of the lethal effect produced by ultraviolet radiation of bacteria.

Dr. Alice W. Knox collaborated with Professor Jungeblut in investigating the activity and occurrence of a previously reported "salivary factor" which is capable of affecting various types of erythrocytes so that they are no longer agglutinable by suspensions of murine poliomyelitis virus (Col-SK strain).

DEPARTMENT OF NEUROLOGICAL SURGERY

Professor J. Lawrence Pool, Executive Officer

Nine lectures to the fourth-year medical students were given in which all active members of the Department participated. The staff also took part in two series of annual lectures on neurological surgery offered to the graduate nurses and to the psychoanalytic graduate students. Professor Pool organized a teaching panel on neurological surgery and served as its chairman for an annual course on compensation medicine at the New York Academy of Medicine in May, 1953.

Professor Pool has continued his interest in the development and application of new techniques and operations for the relief of mental illness in conjunction with the staff of the New York State Psychiatric Institute and

Hospital. As an outgrowth of this type of investigative work over the past seven years a paper on the "Visceral Brain of Man" was presented before the Harvey Cushing Society in April, 1953. With Dr. Thomas J. Bridges, a new and apparently successful surgical remedy for phantom limb pain has been worked out—subcortical parietal lobotomy having several important advantages over other procedures when this syndrome affects a phantom upper limb. In collaboration with Dr. Arthur Battista, Professor Abbie I. Knowlton of the Department of Medicine and Dr. Robert Sengstaken have made a study of electrolyte changes following pituitary gland surgery. This material will be presented in June, 1953, before the American Neurological Association, as will be a paper on the "Consequences of Ablation of Area 4S from the Human Cerebral Cortex," prepared in collaboration with Professor Fred A. Mettler of the Department of Anatomy and Dr. Archie Crandell. Professor Pool has also been active in laboratory research with Dr. Jorgen Therkelsen of Copenhagen, Denmark, and Dr. Melvin D. Yahr of the Department of Neurology on cathode ray oscilloscope studies of the electrical transmission of trigeminal nerve, thalamic and spinal cord sensory impulses. He has also collaborated with Professor B. Frederick Skinner of the Psychological Laboratories at Harvard College in a preliminary study of behavior alterations in specially trained pigeons after various types of brain operations. Finally, the biochemical attack on malignant brain tumors (glioblastoma multiforme) has been continued in conjunction with Professor Alfred Gellhorn of the Department of Medicine, Professor Margaret R. Murray LeDoux of the Department of Surgery, and Dr. Carlos Cortelezii.

Professor John E. Scarff is continuing his study of paralysis of venous origin. Professor Fritz Cramer is completing a paper on tumors of the filum terminale and their surgical management.

Professor Lester A. Mount continues his observations on the circulation and blood pressure of the brain following occlusion of various arteries, using the Lilly Manometer; and, in collaboration with Professor Juan Taveras of the Department of Radiology, an arteriographic study of the collateral circulation of the brain following ligation of carotid arteries in the neck. He is also studying a new method of using the Selverstone clamp for carotid ligation in the neck for intracranial aneurysms.

Professor Edward B. Schlesinger, in collaboration with the Institute for the Crippled and Disabled, is working on improved pharmacological approaches for the amelioration of abnormal neuromuscular conditions, and he has conducted preliminary pharmacological studies on cerebral edema. In collaboration with Professor Taveras, studies of spinal architecture in relation to mechanically based pathology are being made, and carotid thrombosis cases are being reviewed in an attempt to establish a relationship to so-called idiopathic rapidly progressive cerebral atrophy.

Dr. Thomas J. Bridges has contributed new information concerning the

preganglionic vasomotor fibres to the upper extremity by electrical studies combined with pneumoplethysmographic recordings. Further technical improvements and additional observations have been made with respect to the cinematographic studies of cerebral circulation. Dr. Bridges has also conducted a study of the use of induced arterial hypotension as an aid to the surgical treatment of vascular tumors of the brain and spinal cord. In addition, a new method of recording cerebrovascular dynamics has been developed, while a study of pain in patients having carcinoma, together with methods of relief, is being conducted at the Francis Delafield Hospital.

Dr. James B. Campbell is active in laboratory research with the ultimate aim of treating malignant brain tumors by stereotaxic implantation of specially prepared radioactive seeds. This work is being carried out with the constant help of Professor Gioacchino Failla of the Department of Radiology. Dr. Campbell's investigations, partly in collaboration with the Department of Urology, concerning the neurophysiological control of the urinary bladder already show promise of considerable practical therapeutic value. These observations are based on anatomical, electrical, physiological, and pharmacological studies. Dr. Svein Boyesen has been assisting Dr. Campbell during the past year.

Dr. Joseph Ransohoff has continued investigations on the treatment of hydrocephalus with ventriculo-pleural and ventriculo-peritoneal anastomoses and, together, a correlated study of cerebro-spinal fluid dynamics with radioactive sodium in collaboration with Professor Edith H. Quimby of the Department of Radiology. Bimedial lobotomy, temporal lobotomy, and stimulation studies of temporal and frontal cortex are being continued at the New York State Psychiatric Institute in collaboration with Professor Pool, Drs. Norman Sloan, and Murray Glusman of the Department of Psychiatry. A surgical and statistical evaluation of subdural hygromas and hematomas following meningitis in children is in progress. In collaboration with Dr. Sloan, the experimental production of temporal lobe seizures in monkeys is yielding valuable information on seizure mechanism.

Members of the Department participated in two major scientific programs held at the Neurological Institute during the year—the Alumni Society of the Neurological Institute and the annual meeting of the American Academy of Neurological Surgery.

The gratitude of the Department of Neurological Surgery is expressed to all those who have made it possible to pursue research activities through individual financial contributions and grants-in-aid. Gratitude is also extended to colleagues in other departments for their much appreciated cooperation and interest.

DEPARTMENT OF NEUROLOGY

Professor H. Houston Merritt, Executive Officer

The undergraduate teaching activities of the Department of Neurology remained at their usual high level in the past year. The elective course in neurology for third-year students continues to be quite popular. However, the distribution of students over the year is unfortunately uneven—the majority of the students elects the course in the summer months. A large number of postgraduate students and research workers have used the facilities of the Department in the Medical School, but the policy of the hospital has limited the number of clinical fellows who were able to take advantage of the clinical facilities of the Neurological Institute of the hospital.

Among the graduate students who worked a part or all of the academic year in the laboratories of the Department were: Dr. Berry Campbell, Associate Professor of Anatomy, University of Minnesota Medical School; Dr. Raul Carrea, Chief Neurosurgeon, Institute for Experimental Therapy, University of Buenos Aires; Dr. Walter Freygang, Fellow of the National Foundation for Infantile Paralysis; Dr. C. Y. Kao, Research Fellow, Department of Pathology, Cornell University; Dr. John V. Quaranta, Research Associate, New York Zoological Society; Dr. Leonard Zinker, Resident in Neurosurgery, Veterans Administration; Dr. Christian Herrmann, Fellow of the United States Public Health Service; Major James F. Hammill of the United States Army Medical Corps; and Dr. Jack Rutschmann of Geneva, Switzerland.

In the Neurophysiological Laboratories in the School, Professors Fred A. Mettler and Harry Grundfest and Mr. Stanley Crain, in collaboration with Professor Margaret R. Murray LeDoux and Dr. Thelma Flint of the Departments of Anatomy and Surgery, are engaged in studying the electrical activity of nerve cells grown in vitro. Professor Grundfest, with Drs. Joseph Fiasconaro and Harold Sherman of the Department of Dental and Oral Surgery and Drs. Abraham Shanes and Walter Freygang of the National Institutes of Health, is carrying on research on the action of dental anesthetics on fundamental problems of bioelectric activity. Dr. Kao and Dr. Christopher Coates of the New York Zoological Society have worked with Professors Grundfest and Nachmansohn and Dr. Mario Altamirano on other aspects of bioelectric activity, using the squid and the electric eel. Professors Mettler and Grundfest, with various coworkers, are combining morphological, neurosurgical, physiological, and biophysical methodologies in studying certain aspects of central nervous activity. Dr. Mario Altamirano and Professors Grundfest and Nachmansohn have under way a program of investigation, which combines electrophysiological and biochemical studies of nerve activity, using the method developed by Professor Grundfest and Dr. Kao of microinjection into a nerve fiber. The experimental work in the neurophysiological laboratories have been aided by grants from the United States Public Health

Service, the Surgeon General of the Army, the Atomic Energy Commission, the United Cerebral Palsy Association, and the Novocal Corporation.

The previous demonstration, by Professor Mettler, that tremor at rest can be produced by damage of the upper reaches of the cerebellar outflow has been verified by Dr. Raul Carrea, who has further found that damage of the descending limb of the brachium conjunctivum produces ataxia with a minimum of tremor. Evidence, therefore, is being accumulated slowly, indicating that all abnormal movements belong to a closely related family of physiological phenomena and that the organization of the vascular pattern at the base of the brain plays an important role in the manner in which these are combined with other neurophysiological defects to produce the syndromes commonly encountered in clinical practice.

Mr. Harlan Stearns has been working with Mr. Christian Hovde and Dr. Yasuhiko Taketomo in the study of the metabolic consequences of the ablation of striatal tissue. Dr. John Whittier has prepared material on an anatomo-physiological study of carnivore spasm and has been actively engaged in the study of veterinary neurological disorders. On this work he has received the cooperation of the Pitman-Moore Company.

Professor Berry Campbell, in association with Dr. Leonard Zinker, has studied the distribution of potentials elicited in the area of distribution of the ascending portions of the brachium conjunctivum following stimulation of the dentate nucleus or equivalent structure. Potentials have been evoked in the ventrolateral thalamus and in the frontal cortex. Inability to excite the red nucleus in this manner may be explained either on the basis of passage only of fibers through it or, equally well, upon the necessity for some kind of special stimulation.

Dr. Raul Carrea has characterized the origin, course, and terminations of the ventral spinocerebellar and spino-reticular tracts, as well as some of the effects of these, and of the inferior olive on the cerebellum. These three systems and the dorsal spinocerebellar tract form the major ascending spinal inflows into the cerebellum. Each makes a contribution, specific in terms of time and place of arrival, to the cerebellar electrical activity. Singly, or in several combinations, they activate the cerebellum to various extents, and in their totality they initiate a sequence of intrinsic cerebellar activity which culminates in an efferent discharge through which the cerebellum exerts its role in the organism.

Mr. Stanley Crain, in conjunction with Dr. Thelma Flint, who is working under the direction of Professor Murray LeDoux of the Department of Surgery, has succeeded in obtaining resting and action potentials from within nerve cells grown in vitro. In a larger number of cases they have succeeded in electrically stimulating such tissue cultures and recording the cellular discharge from outside the cells. Study of the characteristics of these discharges will presumably cast some light upon the essential physiology of neurons.

Mr. Hovde has completed a search for the loci and a study of the character

of the electrical potentials detectable upon stimulation of the putamen. As it was previously detected in the case of the caudate nucleus, evidence indicates that this portion of the striatum projects to the cerebral cortex rather than the reverse. Findings from histological study of material, sent to the Army Medical School and studied by Van Nauta, however, has been interpreted to indicate that at least some corticostriate connections also exist. It is believed that a corticofugal polarity, if such exists, is less prominent than a corticopetal.

Professor Nachmansohn and Drs. Altamirano and Kao have conducted an extensive series of studies concerning the effects on the bioelectric potentials of changing the internal ionic composition of the interior of the nerve fiber. They employed an improvement of the microinjection technique developed earlier. The interior of the axonal membrane behaves in an unexpected manner as regards its electrical properties. Whereas increase or decrease of internal potassium was expected, on the basis of present theory, to increase or decrease the resting potential, the interior of the membrane proved insensitive to the ionic changes. The findings with K^+, Na^+, Ca^{++}, and Mg^{++} indicate that the membrane of the nerve fiber behaves as a complex electrode with its internal surface having different properties from the external. Additionally, the blocking effectiveness of these ions on the propagated potentials was studied: the study revealed that the interior of the nerve fiber is extraordinarily sensitive to Mg^{++}. The effectiveness of Mg^{++} is 100,000 times greater in this respect than is that of K^+.

Impedance measurements on the single giant axon of squid, by Professor Nachmansohn and Drs. Abraham Shanes and Walter Freygang, in relation to changes of the external K^+ and Na^+ indicate that the external face of the axonal membrane behaves in a manner predictable from theory. Observed were two hitherto unknown phenomena, in which impedance change associated with the nerve impulse was received. The "initial after-impedance" appears to be caused by a decrease of the permeance of the membrane to K^+. The "negativity after-impedance" appears to be due to enhanced Cl^- outflow from the nerve.

Professors Nachmansohn and Grundfest, with Drs. Altamirano and Kao, have applied the microinjection technique to the study of a number of strategic drugs acting at the interior of the axon. The earlier finding that curare, which from the outside has no effect on nerve, is extraordinarily effective in blocking activity when injected was confirmed. Others of the tested substances act as blocking agents in proportion to their effectiveness as anticholinesterases. A dual effect of injected acetylcholine has been found. This substance, like curare, has no effect when applied externally. At the interior, however, it blocks nerve activity in a dose of 10^{-9} gm. when it is injected in low concentrations. When injected in high concentrations the dose for blocking must be 10^{-4} gm. or about 100,000 times higher. In the high concentrations, moreover, the initial effect is to prolong the duration of the nerve impulse as

much as four times. The study, commenced two years ago by Professors Nachmansohn and Grundfest and Drs. Altamirano and Coates, on the electroplax of electric eel has yielded a number of new observations. Two types of innervated single- or few-layered cell preparations have been devised and have greatly aided this research. The individual cell, which is innervated only at one of its surfaces (the caudal), undergoes bioelectric discharge only at that surface. This extraordinary adaptation explains the ability of the electric eel to produce very high voltage discharges (up to 600 volts) from a series arrangement of cells, which individually produce only about 0.15 volts. Effects of neural excitation of the cell are very different from those of direct stimulation. The neural stimulus, though of very short duration, produces temporal facilitation lasting over one second and a very short spatial facilitation. Though direct stimulation can produce cumulative facilitatory effects, these are of small magnitude. These and other properties of the preparations offer highly useful material for studying the mechanisms of neural transmissions, both from its biophysical and biochemical aspects.

Dr. Nathan Kline, serving as Director of Research at the new Research Facility at Rockland State Hospital, has set up a long-range program for the multidisciplinary study of nervous and mental disorders. This program is an outgrowth of the principle of combined operations research instituted by the Department of Neurology in the Columbia-Greystone Projects and puts this principle into operation on a permanent basis at a location where adequate clinical material is available. Special projects under Dr. Kline's direction include basic studies in the nature of vestibular function in schizophrenic patients, isotope monitored studies of endocrinologic function in psychotics, the study of respiratory patterns in psychotics and their response to carbon dioxide, and studies of amino acid and copper metabolism in such patients.

Professor Henry A. Riley has continued the revision of Tilney and Riley's *Form and Functions of the Central Nervous System.* He is also engaged in collaborating with the nomenclature committee of the American Association of Anatomists in the revision of the terminology of the nervous system for the new international nomenclature.

In the immunochemical laboratories at the Neurological Institute Dr. John H. Vaughan and Professor Elvin A. Kabat have developed a new method for the detection and quantitative estimation of trace amounts of antibodies to impurities in the presence of very large quantities of antibody to a given protein. By this procedure it was possible to demonstrate that antibodies to impurities are formed even when relatively small amounts of crystalline proteins are used for immunization. The capacity of certain rabbit anti-ovalbumin sera, to induce passive wheal and erythema sensitivity in human skin, has been shown not to be related to so-called "non-precipitating" antibody but to antibody to as yet undefined minor antigenic constituents contaminating crystalline egg albumin.

Studies on acute disseminated encephalomyelitis produced experimentally in rhesus monkeys are being continued by Professors Kabat and Abner Wolf and Miss Ada E. Bezer. In collaboration with Dr. Edward E. Fischel of the Department of Medicine and Dr. Herbert C. Stoerk of the Merck Institute, Miss Bezer and Professor Kabat have shown that antibody production to egg albumin injected as an emulsion in the Freund adjuvants containing killed tubercle bacilli is substantially enhanced over that obtained when the tubercle bacilli are omitted from the adjuvant emulsion. In a subsequent study, Dr. Fischel, Professor Kabat, and Dr. Stoerk, with Mr. Marvin Skolnik and Miss Bezer, showed that doses of cortisone sufficiently large to inhibit the local granulomatous response to the tubercle bacilli in the antigen-adjuvant emulsion reduced strikingly antibody formation. These results accord nicely with the earlier findings of Professors Kabat and Wolf and Miss Bezer that large doses of cortisone suppressed local granuloma formation and the appearance of disseminated encephalomyelitis in monkeys injected with emulsions of homologous brain and the Freund adjuvants.

Dr. Melvin D. Yahr, Dr. Sidney S. Goldensohn, and Professor Kabat have completed a study of the gamma globulin in the cerebrospinal fluid of patients with multiple sclerosis and other nuerological disorders; these studies were presented at a New York Academy of Sciences Conference in April, 1953. Seventy-one per cent of 250 patients with multiple sclerosis showed an elevated cerebrospinal fluid gamma globulin; increased gamma globulin tends to occur in patients with multiple foci of lesions and multiple attacks and in cases with extensive lesions as indicated by the severity of disability. No relation between cerebrospinal fluid gamma globulin and type of onset of disease, site of lesion, or duration and activity of the disease process was found.

Immunochemical studies on the blood group substances are being continued. Dr. Calderon Howe of the Department of Microbiology and Professor Kabat have completed a study on the action of an enzyme from snail liver on the hog blood group A and O substances. This enzyme extract appears to split off some N acetylglucosamine from the hog A substance and a portion of the fucose from both the hog A and O substances. These changes are accompanied by some loss of blood group A activity and an increased cross reactivity with Type XIV antipneumococcal serum. Blood group O activity appears to be unchanged.

Dr. Sidney Leskowitz and Professor Kabat have developed a method for the quantitative estimation of glucosamine and chondrosamine in mixtures and are applying this to the determination of the relative proportions of these two amino sugars in the blood group substances.

Professor Kabat and Miss Deborah Berg have completed a study of the antigenicity of dextran in man. Injection of small quantities of dextran (1 mg.) into humans induces the formation of precipitins and of wheal and erythema sensitivity. Proof that the antibody formed is indeed antibody to

dextran by the use of radioactive C^{14} dextran, obtained through the National Research Council, was obtained in an experiment conducted by Professor Kabat in collaboration with Professor David Rittenberg and Miss Laura Pontercorvo of the Department of Biochemistry and Drs. M. L. Eidinoff and Leon Hellman of the Sloan Kettering Institute. Studies on the reaction of dextran and antidextran, in relation to the structure of various dextrans, are being carried out by Professor Kabat and Miss Gloria Petrilli.

Professor Kabat spent a half-year sabbatical at the University of California at Berkeley working in the Biochemistry Department in sugar chemistry under Professor H. O. L. Fischer. In collaboration with Professor Fischer and Drs. D. L. MacDonald and C. E. Ballou, Professor Kabat investigated the structure of galactinol, a disaccharide of galactose and mesoinositol.

The experimental work in the immunochemical laboratories was aided by grants from the William J. Matheson Commission, the United States Public Health Service, and the Office of Naval Research.

Professor Paul F. A. Hoefer and his associates in the electroencephalographic laboratories at the Neurological Institute have continued their studies on the changes in the electrical activity of the cerebral cortex in various morbid states. Among the completed and current studies are: the action potential and refractory period of striated muscles by Professor Hoefer and Drs. Gilbert Glaser, Christian Herrmann, and Thelma Estrin; the electroencephalogram in treated cases of epilepsy by Professor Hoefer, Drs. Zira DeFries, Susan Browder, and Leon Golub; review of clinical and electroencephalographic findings in 1,200 cases of verified tumors of the brain by Professor Hoefer; and the electroencephalogram at the point of flicker fusion by Professor Hoefer and Dr. Jack Rutschmann.

Professor Hoefer and Dr. Henry Aranow of the Department of Medicine are conducting a long-term study of patients with myasthenia gravis. One new compound, octomethylpyrophosphate, has been given a preliminary trial in the therapy of this disease. This compound, an anticholinesterase, has a more prolonged action than neostigmine, but it has not been shown whether the new compound will have a permanent place in the therapy of myasthenia gravis. Professors Hoefer and Aranow, in conjunction with Dr. Lewis Rowland, have made a complete analysis of the clinical data in the 156 cases of myasthenia gravis which have been studied at the Medical Center during the past 20 years. Dr. Lewis Rowland has made a study of the pathological findings and the factors leading to death in 35 cases of myasthenia gravis.

Professor H. Houston Merritt, Dr. Gilbert Glaser, and Dr. Christian Herrmann completed their study on the long-term effects of the administration of cortisone and corticotropin on the course of multiple sclerosis. These compounds have some beneficial effects on the spasticity present in these patients, but they have no significant beneficial effect on the course of the disease in the majority of the patients. In addition, the untoward side effects of these

compounds make them unsuitable for prolonged administration to these patients.

In the Epilepsy Clinics at the Vanderbilt Clinic, Professors Sidney Carter and Daniel Sciarra and Drs. Frederic Zimmermann, Melvin Yahr, Zira De-Fries, Susan Browder, and Leon Golub have continued their studies on the pathophysiology and therapy of epilepsy. The role of sleep in the production of abnormal activity in the electroencephalogram has been a subject of particular interest. Further experience with the use of the analeptics, benzedrine and dexedrine, indicates that these compounds have a corrective action with respect to the electrical abnormality and are of definite therapeutic value in patients with nocturnal seizures. Various new compounds have been tested for their anticonvulsant action. None of these have proven to be definitely superior to the drugs now commonly in use. The studies in the convulsive disorder clinic were aided by grants from the Association for the Aid of Crippled Children, Parke Davis & Company, the Lazarus Foundation, the Teagle Foundation, and Mrs. Arthur J. Rosenthal.

Drs. Louis Doshay, Kate Constable, and Adolfo Zier have continued their studies of patients with paralysis agitans. Numerous new compounds have been tested for their effects on the tremor and muscular rigidity which is present in these patients. A small laboratory has been established in the Neurological Institute for the objective study of these symptoms. The work of this laboratory has been aided by grants from the Eli Lilly Company, the Upjohn Company, Lederle Laboratories, and Smith Kline and French and Berkeley Industries.

Clinical studies in cerebral palsy were conducted at the Vanderbilt Clinic by Professor Sidney Carter, in conjunction with members of the Pediatric and Physical Medicine Departments. Experimental work in the pathophysiology of abnormal movements and increased muscular tone were conducted by Dr. Malcolm Carpenter, Dr. John Whittier, and Mr. Hovde, in the neurophysiology laboratories under Professors Grundfest and Mettler. The role of infections and noxious agents on the embryo in relation to the development of cerebral palsies continued to occupy the attention of Professors Abner Wolf and David Cowen in the neuropathology laboratory. The clinical and experimental work in cerebral palsy was aided by grants to the Hospital and Medical School by the United Cerebral Palsy Association.

The Department at the Montefiore Hospital, under Professor Theodore J. C. von Storch, continues to carry a large part of the undergraduate teaching and the major portion of the postgraduate clinical teaching. Professor Arnold P. Friedman continues his studies of the physiological and psychological aspects of headache of the migraine and tension types. Dr. Martin G. Netsky and Professor Harry M. Zimmerman, of the Department of Pathology, have made a number of contributions to the pathology of various neurological diseases, including familial ocular myopathy, meningiomas, amyotrophic lateral sclerosis, malignant lymphomas, and vascular tumors of the spinal cord.

Professor David Nachmansohn gave a series of lectures on various aspects of nerve function in Paris, where he received the Pasteur Medal from the Société de Chimie Biologique. In Rome, Professor Nachmansohn was the guest of the Instituto Superiore di Sanita. He also gave lectures in Switzerland, Naples, and in Israel, where he attended a symposium organized under the auspices of the Hebrew University Hadassah Medical School. Professor Abner Wolf received the Weinstein Award of the United Cerebral Palsy Association for his work on the role of infections in the mother on the development of abnormalities in the fetal nervous system. Professor Merritt was elected Secretary of the American Neurological Association and President of the Association for Research in Nervous and Mental Disease. The latter Association held its annual meeting in New York in December, 1952, and discussed Toxic and Metabolic Diseases of the Nervous System. Professor Robert F. Loeb of the Department of Medicine was Vice-President of this Association. Other contributors to the scientific program from our School included Professors Irving M. London, Gilbert M. Mudge, and Franklin M. Hanger of the Department of Medicine; Dr. Gilbert H. Glaser and Professor Paul F. A. Hoefer of the Department of Neurology; Professor Emanuel M. Papper of the Department of Anesthesiology; and Professor Harry M. Rose of the Department of Microbiology.

It is with deep regret that we announce the death of Professor Bernhard Dattner. Professor Dattner joined our staff in 1945 and was faithful in his duties until a few weeks prior to his death from a brain tumor. He contributed greatly to the training of our students because of his special knowledge of infections of the nervous system and cerebral localization.

Professor Riley was made Professor Emeritus on July 1, 1953, after many years of devoted service. Professor Riley played an important role in the establishment of the Neurological Institute at the Medical Center and in its unification with the Presbyterian Hospital. In addition to teaching in the clinical department, Professor Riley was active in the teaching of neuroanatomy and made extensive contributions to our knowledge of the anatomy of the nervous system. Dr. Gilbert H. Glaser resigned in October, 1952, to take the position of Assistant Professor of Medicine at Yale University, where he will be in charge of Neurology at the Grace-New Haven Community Hospital. Dr. Saul Korey resigned in July, 1952, to accept the appointment of Associate Professor of Neurology at Western Reserve University in Cleveland, where he will direct the program of research in Neurology.

DEPARTMENT OF NURSING

Professor Eleanor Lee, Acting Executive Officer

The effect of the University status is indicated by the rapid increase in the number of degree candidates. In 1952, 75 per cent of the 322 students enrolled

were candidates for both the degree of Bachelor of Science from Columbia University and the diploma in nursing from the Presbyterian Hospital. In September, 1937, 28 students in the entering class of 81 met degree requirements. In 1939, the first year in which there were degree candidates in each class registered, there were 98 degree candidates, 35 per cent of the 279 enrollments. In 1943, the peak registration year in the history of the School, of the 388 students enrolled 65 per cent were degree candidates. The forecast for the class entering in September, 1953, shows 130 candidates, 85 per cent of whom are degree candidates.

The withdrawal rate is of special significance. The withdrawal rate for the class of 1953 was 11.5 per cent; for the class of 1951, 10 per cent—evidence of careful selection and, also, of the attraction of students of high quality to the School's nursing program.

A total of 1,796 students have been enrolled in the Columbia University Department of Nursing since September, 1937. There was a total of 319 resignations, representing 17.7 per cent. The reasons for the resignations were as follows: health, 27 per cent; marriage, 27 per cent; scholarship, 18 per cent; unsatisfactory adjustment, 15 per cent; personal (including home responsibility), 7 per cent; other reasons, such as returning to college, teaching, or studying medicine, 6 per cent. The attrition rate for schools of nursing in this country as a whole is one student out of every three, or 33⅓ per cent.

Three new scholarship funds in the Department of Nursing represent progress toward meeting the need for full-tuition scholarships.

The Mary Sencindiver Specht Scholarship Fund, in memory of the late Mary Sencindiver, ex 1951, was established in August, 1952, by the gift of $1,000 from Mrs. Gerrish Milliken—the income of $50 is to be awarded annually, beginning September, 1953, to a member of the entering class.

The Margaret E. Conrad Scholarship Fund, established in June, 1952, with a gift of $2,000, has been augmented during the past year with contributions totaling $1,000. Through the generosity of the family and friends of the late Virginia B. Dilday $230 was received. The income of $150 will be awarded annually, beginning September, 1953, to a member of the entering class.

The Jane Craig McAllister Scholarship Fund, established in February, 1952, gave financial assistance to two students. During the year, donations to this Fund totaled $752, of which $282 was contributed in June by the Class of 1954 in recognition of the honorary member of their class, Dr. Ferdinand F. McAllister. One hundred dollars for this fund was received in May from the Columbia University Committee for Community Service from the proceeds of the Thrift Shop through the efforts of the student committee in the Department of Nursing.

The Dean Sage Memorial Scholarship was awarded to Miss Esther V. Rosengren. This was the seventh award of the Scholarship which provides tuition and University fees for a degree candidate.

One scholarship of $200 from the Florists' Telegraph Delivery Association, Inc., Units A & B, Region 2, has been made available again this year through the interest of Mr. John Cardasis of the Medical Center Florist Shop. It was awarded to Miss Barbara A. Herrin.

The Alumnae Association of the Presbyterian Hospital School of Nursing increased the amount of each of its scholarships to $75.

Fourteen scholarships were awarded in April, 1953—four to students in the Class of 1953, five to students in the Class of 1954, and five to students in the Class of 1955.

A total of one hundred dollars was granted for University stipends—fifty dollars each to two students.

Miss Dolores C. Farrell, graduate of Cochran School of Nursing, was appointed Instructor in Nursing to replace Miss Alice L. Rodenhiser. Miss Farrell has been night supervisor at Babies Hospital for three years and is well qualified for the teaching of pediatric nursing.

Miss Ruth M. Guinter returned after two years as surgical supervisor at the American Hospital in Beirut and was appointed Instructor in Nursing. Miss Elizabeth M. Kennedy was appointed Instructor in Nursing, assigned to the out-patient nursing service, to replace Miss Lynn Williams, who resigned.

Miss Bernice R. Derby was appointed in January, 1953, as Instructor in Nursing, assigned to gynecology. Miss Lillian C. Brown was transferred to an administrative position in Presbyterian Hospital in December, 1952. Mrs. Shirley Tanner Myers was appointed Instructor in Nursing, assigned to nutrition and diet therapy, to replace Miss May McMillan, who resigned.

Considerable progress has been made this year toward further integration of the basic sciences, anatomy, physiology, chemistry, microbiology, and nutrition with nursing. During the Winter Session of the first year, the basic-science course of 180 hours is divided into six units—this includes also the content of the introduction to nursing course of 180 hours; thus the learning experiences and the nursing situation have real meaning to the student. In the Spring Session, the same plan of integration is followed with the basic-science course of 60 hours and the nursing in medicine and surgery course of 180 hours. The content, which is divided into five units, includes all aspects of nursing—the reaction of the patient to his situation, various forms of therapy such as drugs, diet, etc., and clinical factors of medicine and surgery. Mental health is included throughout the entire academic year. During each semester comprehensive examinations are given after the completion of each unit.

A total of 118 students completed this first-year program with good records in clinical practice as well as in class work. These students had the opportunity to participate in the team method of patient care which was extended in February to the medical and surgical services. Through classes and

conferences these students were put through an orientation to the principles of the team; this has resulted in better patient-centered nursing care. Another factor which contributed to the success of the first-year program was the new rotation schedule within the medical and surgical services. This new plan includes two weeks of the Diet Service with experience in the medical service, and later the other required two weeks of Diet Service with experience in the surgical service. Each student has also had observational experience in the recovery room and in the admitting clinic of the out-patient department. In addition, arrangements were made with the Visiting Nurse Service of New York for a one day observation in the district by each of 51 degree students during their first year. The first group of eight students of the Class of 1955 were assigned to the operating room on June 1 (five months earlier than for previous classes) for six weeks of clinical experience; this was followed by two weeks in the recovery room, another forward step in this year's program.

A study of communicable disease nursing and its placement in the curriculum has been carried on by the clinical teaching committee. Notification has been received from the Secretary of the State Board of Nurse Examiners that beginning in January, 1954, the content of the examination on communicable disease will be distributed throughout the other examinations which cover the five major clinical areas. Two workshops were conducted by the clinical teaching committee—one in February, at which time the program for the first year and a half was presented, and another in April, for the second half of the program. A revision of the clinical teaching manual is now being prepared in a new form to correlate classroom and clinical teaching and to include content, method, and student activity. The development of the clinical teaching programs in the various clinical areas to which students are assigned has been most noteworthy during this past year. For example, the four-week teaching program on the gynecology service includes, in addition to a very successful team concept of nursing care, a visit to the Francis Delafield Hospital for each group of eight students. During the twelve weeks of pediatric experience, each student is assigned to the well-baby clinic, assists with the immunization program, and has an opportunity to talk with the parents. For the senior class, this past spring, group presentations of nursing care replaced the former doctor's oral examinations in medical and surgical nursing. The Class of 1953 is the first class in the history of the School having 100 per cent clinical experience in psychiatric nursing.

The Out-Patient Nursing Service continues to be most valuable in the educational program. The number of home visits was 2,233. Also included were field trips to welfare agencies, observations at the Child Health Service of the Washington Heights Health Center, and presentation of family studies at weekly conferences.

Senior elective experience for the Class of 1953 included time at the Mary

Imogene Bassett Hospital in Cooperstown, Visiting Nurse Service of New York, and the Willard Parker Hospital.

During the year, 90 students took the State Board examinations and all passed successfully. The report of 66 candidates who took the October, 1952, New York State Board Examinations in six clinical areas showed the following means for the group: nursing in psychiatry, 92.7 per cent; nursing in medicine, 92.4 per cent; nursing in children, 92.3 per cent; nursing in communicable diseases, 91.6 per cent; nursing in obstetrics, 91.4 per cent; nursing in surgery, 89.5 per cent. The high rating—particularly in psychiatry—proves that the mental health component and the psychosomatic approach is well integrated throughout every area of the curriculum. Seventy-two and eight-tenths per cent of these 66 candidates received in six examinations an average between 96.2 per cent and 90 per cent; 21.2 per cent between 89.8 per cent and 86.3 per cent; and 6 per cent between 84.2 per cent and 82 per cent.

The obstetric affiliation with Mt. Sinai Hospital School of Nursing, which started 55 years ago at Sloane Hospital for Women at 59th Street, was terminated in April, 1953. A framed certificate signed by both Dean Rappleye and Mr. Cooper, President, Presbyterian Hospital, was presented to the Mt. Sinai School. Notification has been received from St. Luke's Hospital School of Nursing that their affiliation, after 62 years, will be discontinued in August, 1953.

The Moses Taylor School of Nursing in Scranton, Pennsylvania, is closing with the last group to affiliate in obstetrics and pediatrics this fall.

Hartwick College School of Nursing is a new affiliation for obstetric nursing which started in May. This increases their affiliation to nine months and includes neurological, outpatient, and pediatrics nursing.

Another new affiliation for obstetric nursing, starting September, 1953, is Southampton Hospital School of Nursing. This is to precede their pediatric experience here.

Four weeks of senior experience in obstetrics, pediatrics, and surgery for six students from the Yale School of Nursing was arranged this spring. Twelve weeks of senior experience for a student from Meharry Medical College School of Nursing in Nashville, Tennessee, was arranged in neurological nursing at the request of the Dean.

Field experience for fifty-five Teachers College students was also provided.

On Tuesday, June 2, at the commencement exercises of Columbia University, the degree of Bachelor of Science was conferred on 64 graduates of the Department of Nursing. Following the Commencement a reception was held at the Women's Faculty Club at which Dean Rappleye presented the degrees to each graduate. The graduation exercises for the Class of 1953 were held in the garden of the Presbyterian Hospital on Thursday, June 4. Diplomas were awarded to 100 graduates by Mr. William E. S. Griswold, Jr., Chairman of the Nursing Committee of the Presbyterian Hospital.

A grant of $20,000 was made by the China Medical Board, Inc., in December, 1952, for the Department of Nursing. A special project in curriculum study, under the faculty of the Department of Nursing, will start July 1, with the appointment of Miss Dorothy E. Reilly as Director. Miss Angela Del Vecchio will replace Miss Reilly as Instructor in Nursing. The study will be made of the four teaching services, general medical and surgical and their adjuncts, diet service, recovery room, outpatient department, etc., to determine the educational experiences available to the first-year nursing students.

A workshop on nursing for college women was held June 8–10, 1953. The Department of Nursing was one of the sponsoring agencies with eight participants as guests in Maxwell Hall. A program of observation with the Visiting Nurse Service of New York and the United Nations Health Services emphasized nursing as a community service. Miss Josephine C. Brown was co-chairman of the project, which was attended by twenty college students.

The two scholarships from the Visiting Nurse Service of New York were awarded to Miss Catherine McGrath and Miss Margaret Koch in October, 1952.

Lady Buckmaster of England spoke to the students in March on "Coronations Past and Present." We are indebted to Professor Rudolph H. Schullinger of the Department of Surgery for this memorable occasion.

A third edition of *Essentials of Nursing* was prepared by Professor Helen F. Pettit and Miss Ruth A. Lynch. Several articles have been published in the *American Journal of Nursing* by Professor Marjorie Peto, Miss Margaret Ross of the Class of 1954, and Mrs. Helen C. Delabarre.

A copy of the film, "Hospitalized Poliomyelitis Patient," made here in August, 1952, with the help of Professor Delphine Wilde has been presented by the National League for Nursing to the Department for use in teaching.

During the year Professor Lee has served as a member of the Education Committee of the Visiting Nurse Service of New York. Professor Mutch has been an active member of the Committee for Training Nurses for Atomic Disaster in New York City. Professor Cleveland is a member of the Conference Committee for the Improvement of Nursing Care for the People of New York State. Professor Pettit is corresponding secretary of the new Southern New York League for Nursing.

A curriculum conference, sponsored by the New York State League for Nursing and the New York State Education Department was held at the New York Academy of Medicine on March 26 and 27. Representatives from the Department were Professors Lee and Deleuran and Misses Kent and Reilly. Professor Pettit was chairman of the program on teaching demonstrations.

The educational program for the students has been vastly improved by the broadened clinical experience now available at the Columbia-Presbyterian Medical Center. With the full cooperation of the nursing staff of the Presbyterian Hospital and the introduction of the team concept of nursing care, definite progress has been evident during the past year.

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Professor Howard C. Taylor, Jr., Executive Officer

In opening the report of the Department of Obstetrics and Gynecology it seems appropriate to refer at once to the death of Professor Howard C. Moloy on March 13, 1953, since his work has been of such importance to the Department for so many years. Professor Moloy's study of the anatomical structure of the female pelvis in relation to labor and his development of a precise x-ray technique for demonstrating this relationship were responsible for much that was characteristic of the Department's teaching and management of the obstetrical patient. The principles derived from his work will continue, but the loss of his person will be keenly felt. Professor Moloy died while on duty in the Hospital, a few minutes after his successful completion of a Cesarean section.

There have been a number of changes in personnel. Dr. Gray H. Twombly has resigned to become Professor of Gynecology at the New York University College of Medicine, and Dr. Charles A. Duncan has left to become a member of the Department of Medicine in the University of Louisville School of Medicine.

Among the new appointments are those of Dr. Salome Gluecksohn-Waelsch as Research Associate, and Dr. Lothar Gidro-Frank as Instructor in Psychiatry assigned to this Department. New Research Assistants include Drs. William D. Cohen, Jay J. Gold, Louise L. Phillips, Helena de Roetth, and Jean P. Rosselet. Dr. Albert Plentl has been recommended for appointment as Assistant Professor and Dr. Anne Southam as Assistant, to begin on July 1, 1953.

Five Visiting Fellows have been attached to the Department during the last year. These are Dr. Rene Diaz from the University of Antioquia Medical School, Medellin, Colombia; Dr. Raymond Laurent Van de Wiele from the University of Louvain, Belgium; Dr. Michel Thiery from the University of Ghent, Belgium; Dr. Hector Enrique Bernal from the National University of Colombia; and Dr. Ernest Manley Newkirk from Richmond, Virginia, who worked under a Fellowship from the National Cancer Institute. Beside the Visiting Fellows there have been Visiting Scholars from Brazil, Canada, Yugoslavia, Austria, and Pakistan.

There has been no major change in the organization of teaching plans in the Department during the last year. However, special effort has been made to give more attention to the individual student. To that end frequent, regular meetings are now held by members of the Department with senior residents. At these meetings general problems of instruction and those of individual students are discussed.

In the field of endocrinology, which is perhaps the logical area with which to begin the account of the research activities of the Department, particular

reference should be made to the basic biochemical studies on steroid hormones being made by Professor Seymour Lieberman and the group working with him. Supported by grants from the Damon Runyon Memorial Fund, the American Cancer Society Inc., the United States Public Health Service, and a contribution from the McMillin Fund of the Presbyterian Hospital, this group, while working primarily on cancer, has found it practical as well as necessary to investigate many of the fundamental biochemical aspects of the steroid hormones in the human organism. Dr. Sylvia Teich, working with Mr. Paul Levitan, has been synthesizing the glucuronosides of various steroids, and has been developing methods for the examination of the metabolism of the steroids by perfusion experiments upon various organs, such as the adrenal, liver, and placenta. Dr. William Cohen has been working with various chromatographic and spectrophotometric methods for the determination of steroids, with particular reference to certain special compounds.

Under the heading of endocrinology, reference must also be made to the work of Professor Joseph W. Jailer and his associates, Dr. Gold, an American Cancer Society Fellow, and Dr. Raymond Van de Wiele, a Belgian government Fellow in Obstetrics and Gynecology. An earlier observation has shown that the administration of cortisone, or Compound F, to patients with adrenal hyperplasia and virilism results in a fall in the urinary 17-ketosteroids, while no such fall occurs when an adrenal tumor is the cause of the disease. Further investigations have led to the theory that there is a defect in the steroidal metabolism in congenital adrenal virilism in which 17-hydroxyprogesterone, instead of leading to the synthesis of Compound F, is degraded by the liver to form androgenic steroids which are responsible for masculinization. This group of studies has led to a special interest in the more benign cases of hirsutism. As a result a special clinic has been set up for such patients, who will be used for intensive studies of this problem.

Problems of fertility follow those of endocrinology. Under a grant from the United States Public Health Service Professor C. Lee Buxton is continuing his investigation of cervical spermicidal bacteria. The laboratory bacteriologic aspects of this work are now being conducted by Dr. Grace Girvin, who has accumulated a large amount of interesting material, not only with regard to the special problems of sterility but in relation to the entire subject of the bacteriology of the cervix. The clinical assistants in this work have been Dr. Walter L. Herrman, who has now returned to his home in Switzerland, and Dr. Anne Southam, who will take over the work following the completion of her residency on July 1, 1953.

Dr. Landrum B. Shettles has been working with the unfertilized human ova obtained from Graafian follicles and fallopian tubes. The work, which has already led to a paper awaiting publication in the *American Journal of Obstetrics and Gynecology,* is concerned with methods for obtaining living ova for study by means of phase contrast microscopy, observation of sperma-

tozoan behavior about the ova, the penetration of the egg in vitro, and the maturation of the ovum with special reference to polar body formation.

In relation to the embryonic period of development, Dr. Salome Gluecksohn-Waelsch, in association with Professor Earl T. Engle, is studying the mechanism of genetically controlled embryonic death during early pregnancy. This study is being made under grants from the United States Public Health Service and the American Cancer Society. This project, with such important possible applications to obstetrics, is concerned with the analysis of the mechanism of hereditary factors in mammalian embryos that are responsible for either embryonic death or severe malformations of the newborn. The work is being carried out in the house mouse, of which a breeding colony of highly inbred mutant strains has been established in the division of animal care. Mutations maintained in this colony show a variety of abnormalities of different organs and systems which lead to death in the early stages of pregnancy in a predictable number of embryos.

A number of clinical studies are also being made in relation to deleterious influences upon the growing embryo. Professor Buxton working with Dr. Leslie Dunn of the Department of Zoology, Columbia University, Dr. Philip Levine of the Ortho Products Company, and Professor Richard L. Day of the Department of Pediatrics, has instituted a study on blood group incompatibilities as possible cause of pregnancy wastage.

Dr. Harold Speert has been reviewing former cases of habitual abortion in the Sloane Hospital with a view to obtaining a better measure of prognosis. He has also been working with Professor Katherine K. Merritt and other members of the Department of Pediatrics on the incidence and significance of uterine bleeding in early pregnancy. Professor Engle has collaborated with Dr. Robert Hallet, a resident in this Department, in the study of the time of return of ovarian cycles following spontaneous abortion. He has worked with Dr. Masamichi Suzuki of the Atomic Bomb Casualty Commission on the return of ovarian cycles following therapeutic abortion in Japanese women.

A group for the study of the physiology of the human maternal organism was organized last year by Dr. Plentl. This group includes several other members of the resident staff, namely Drs. Mary Jane Gray, Donald L. Hutchinson, Morris Gelfand, and Earl B. Neslen. Methods for the determination of sodium space with tagged sodium and water balance with deuterium oxide have been developed in laboratories assigned to this group. With such techniques this group has been working upon the effect of cation exchange resins on water and sodium distribution in toxemia of pregnancy, on sodium space in normal pregnancy, and upon the volume and rate of exchange of the amniotic fluid. This work has already resulted in a number of significant publications. Another aspect of pregnancy physiology is being investigated by Drs. Byron C. Butler and Phillips, who are studying the activator of the fibrinolysin enzyme system of the placenta and endometrium.

The phenomenon of labor itself continues to be a subject of investigation. During the last year Professor Charles M. Steer completed the analysis of the electrohysterographic records of 560 labors, demonstrating a difference between normal and abnormal labor, and showing in particular that cases of uterine inertia can be divided into two types, each of which requires a special form of treatment. Dr. Robert L. Hallet has been studying the effect of conduction anesthesia on the course of labor, as measured by the electrohysterograph and internal tocography. Dr. Jerome Harris is coauthor of a book now in press, to be entitled *Clinical Measurement of Uterine Forces.*

Research in the field of gynecologic cancer has been particularly active, owing to the generous support of this research from several sources already mentioned. In general, the research may be said to fall into two large fields—that concerned with the relationship of the steroid hormones to cancer and that based on morphological studies. In the latter area, however, a correlation with biochemical aspects has begun to be stressed.

Reference has already been made to fundamental physiological and biochemical studies on the steroids being made by Professors Lieberman and Jailer and their respective associates. Of more immediate reference to the cancer problem may be noted the analysis of the 17-ketosteroids being excreted by gonadectomized and adrenalectomized patients. This work, under the direction of Dr. Lieberman, is being carried out by Dr. William Cohen, Mr. Bert Mond, Mr. George Broussalian, and Mrs. Sallie Marshall. A two-year study is also being completed on the clinical usefulness and the metabolism of progesterone administered for the treatment of patients with cancer of the cervix. Reference has also been made to the observation of Professor Jailer and his group that adrenal virilism due to tumor of the adrenal may be distinguished clinically from that due to simple hyperplasia by the administration of cortisone, or Compound F, since a fall in the urinary ketosteroids occurs in the presence of the benign hyperplasia but not in the presence of tumor. This has come to be regarded as a fairly reliable practical test.

The laboratory of Professor Saul B. Gusberg, whose clinical responsibility is the diagnosis of Papanicolaou smear tests, has devoted its research energies to the continued study of radiosensitivity of cervical cancer by histochemical and cytological techniques. Preliminary studies indicate that a shift from active to inactive cells occurred in patients who are responding favorably to radium or x-ray therapy. It is hoped that such studies can eventually be used in making the decision as to proper treatment for patients with cervical cancer. Professor Gusberg, with Dr. David Moore, has continued his study of the clinical pattern of intra-epithelial cancer of the cervix. In collaboration with Drs. James Corscaden and Walter P. Kosar, he is publishing a paper on interstitial radium in the treatment of advanced cancer of the cervix.

An extensive study is being conducted on the cytological and hystochemical differentiation of ovarian carcinoma with a morphologic starting point. It is known that a wide range of forms having different degrees of malignancy or differentiation exists among the papillary tumors of the ovary. In the current investigation all benign and malignant papillary tumors of the ovary are studied and classified according to the degree of differentiation by hystochemical preparations prepared by Dr. Margaret Long. Following this classification, the tumor tissue is being studied by Dr. D. V. N. Reddy and Dr. de Roetth in the laboratories assigned to the Department in the Delafield Hospital. It is hoped that it can be shown that the different morphologically determinable degrees of differentiation can be correlated with specific and measurable biochemical differences.

Related to the cancer field, preliminary work by Professor Engle on special techniques for the demonstration of the basement membrane in cancer of the cervix and in normal cervical epithelium may be noted. An analysis of a long series of cases of abnormal uterine bleeding in the absence of definite tumor has been made by Drs. Equinn W. Munnell and Ferdinand Flick. An examination of sections of endometrium in patients with carcinoma of the cervix has been made by Dr. Speert to determine evidence of any abnormal estrogenic activity. Dr. Speert has also published a report on the premalignant phase of endometrial carcinoma. Dr. Salim J. Dalali, in collaboration with Dr. Arnold Bachman, is completing investigation of the value of pelvic venograms as an aid in differentiating edema of the lower extremities due to lymphatic obstruction from that due to venous obstruction. The method may also be of great value in locating the point of bifurcation of the common iliac veins, a critical area for the direction of the x-ray beam in the treatment of cancer of the cervix. Dr. Byron C. Butler has completed a two-year study on the use of hypnosis in the care of cancer patients, a report of which will appear in the November number of *Cancer*.

An important aspect of gynecology and obstetrics, largely unstudied, is that of psychiatric and psychological problems. Starting in July, 1952, Dr. Lothar Gidro-Frank of the Department of Psychiatry has been assigned for work here. Two projects in research have begun—one concerned with the problem of pelvic pain and the other with the reactions to pregnancy of normal patients who are attending our antepartum clinic. This research project is being accompanied by a series of conferences on the psycho-dynamics of obstetrical and gynecological conditions held with the fourth-year medical students during their clinical clerkship in this Depatment.

Extramural activities of members of the Department have continued to be numerous and include lectures delivered in various hospitals, meetings, and medical schools by Professors Earl T. Engle, C. Lee Buxton, Howard C. Taylor, Stanley M. Bysshe, Joseph W. Jailer, Seymour Lieberman, and Saul

B. Gusberg and Drs. Butler and Jerome Harris. Dr. Gluecksohn-Waelsch participated in the Conference at Oak Ridge, Tennessee, on the effects of radiation and other deleterious agents on embryonic development.

Professor Buxton has been elected Chairman and Professor Bysshe, Secretary, of the Section on Obstetrics and Gynecology of the New York Academy of Medicine. Professor Engle will begin his term as President of the Endocrine Society. Professor Gusberg has been elected to the Organization Committee of the Inter-Society Cytology Council. Professor Taylor has been appointed to serve as co-editor, with the Professor of Obstetrics and Gynecology of the University of Chicago, of the *American Journal of Obstetrics and Gynecology*, and is serving as Chairman of the Medical and Scientific Committee of the American Cancer Society.

Professor Engle gave the Biennial Sir William Fletcher Shaw lecture before the Royal College of Obstetricians and Gynecologists in London, as well as several other lectures in England and Copenhagen. Professor Emeritus Benjamin P. Watson gave the first Frederick W. Marlow lecture at the Academy of Medicine in Toronto, Canada, on "The Integration of the New with the Old."

DEPARTMENT OF OPHTHALMOLOGY

Professor John H. Dunnington, Executive Officer

The undergraduate teaching activities of this Department have undergone no radical changes, but greater emphasis has been placed upon the residency training program. Fourteen visiting scholars, representing ten foreign countries, have studied with the Department. The resignation of Assistant Clinical Professor Ramon Castroviejo has been accepted with regret. Drs. Arnold Forrest and Ira S. Jones have been appointed Assistants.

Professor Ludwig von Sallmann, under the auspices of the Knapp Memorial Foundation, has continued his investigations. Radiation cataract has been the subject of an intensive study. Some of this work was done under the guidance of Professor Gioacchino Failla of the Department of Radiology with coworkers from the University of California as well as from our Department. These experiments have shown that the injurious effects of deuterons and alpha particles surpass those of X rays of similar dosage. Furthermore, the peripheral portion of the lens is less affected by ionizing radiations than is the small central germinative zone. Studies on protection against x-ray radiation by chemical agents are underway, but as yet no conclusions have been reached. A surface dose of 5,000 rep of beta irradiation has been found to cause cytological and biomicroscopic damage to the rabbit lens. This dose is much smaller than that frequently used for the obliteration of corneal blood vessels in the human eye. Professor von Sallmann, with the

assistance of Dr. Burkhardt Pillat, has evaluated quantitatively the behavior of the intraocular capillaries under the influence of ACTH and cortisone. They have shown that an intravenous infusion of ACTH potentiated the responses of the intraocular vasculature to adrenaline, noradrenaline, acetylcholine, and electric stimulation, but no such responses occurred when suspensions of cortisone or solutions of cortisone compounds were used. Dr. Pillat completed the work on determination of adrenaline and noradrenaline in the aqueous humor, and in the iris and ciliary body of beef eyes. He showed that the aqueous humor of beef eyes is free from a measurable amount of the catichol amines but the iris and ciliary body contains noradrenaline in quantities 0.1 to 0.2 micrograms per gram of tissue.

Studies on the effect of iso-niazid (Rimifon) on experimental ocular tuberculosis have been carried out by Professor von Sallmann, in collaboration with Dr. Philip Knapp. Early treatment inhibited the development of signs of tuberculous uveitis, but relapses occurred unless the treatment was continued for a long period of time. Histological examination of the clinically quiet eyes showed no inflammatory foci.

Working under a contract with the Surgeon General of the United States Army, Professors von Sallmann and Zacharias Dische, in collaboration with Drs. Robert L. Wiggins and Anthony Donn, are conducting studies on absorption of blood from the vitreous. This complex problem is being approached from several angles. The first experiments have shown that anticoagulants do not augment the absorption of blood injected into the vitreous of rabbits, nor do the enzymes of streptokinase and streptodornase exert any beneficial effect unless the human serum factor is added. Chemical studies on the proteins of the vitreous and their relation to the mucopolysaccharides are being conducted as is the effect of ultrasonics on the vitreous gel of beef eyes.

Professor George K. Smelser's studies have shown that conventional contact lenses cause a thickening of the cornea. By histological examination this thickening was found to be due to an increase in the corneal fluid which lies between the connective tissue fibers and lamellae. The distortion produced by this fluid is responsible for the hazy vision which develops when such lenses are worn. In experimental animals the glycogen stores of the corneal epithelium were rapidly depleted when contact lenses were worn because a more rapid use of these carbohydrate stores occurs when the metabolism of the cornea is carried out under anaerobic conditions. He found that the metabolic activity of the cornea is concerned with the "pumping out" of water, which is necessary to maintain the normal degree of hydration and transparency of that tissue.

Professor Smelser has also reported on the relation of the lacrimal secretions to the healing of corneal injuries. Removal of the tear glands in experimental animals resulted in a corneal turbidity and a roughening of the corneal epithelium.

His studies on the influence of the thyroid hormone on mitotic activity in the cornea have shown that experimentally induced hyperthyroidism decreased the frequency with which corneal epithelial cells divide and increased the time required to complete the mitotic process. Together, these two effects tend to reduce the rate of replacement of cells in the corneal epithelium. Epithelization following corneal burns was somewhat delayed in the hyperthyroid animals, indicating that thyroxin also inhibited this type of protoplasmic movement. Marked hypothyroidism was shown to have no significant effect on mitotic activity or the healing of superficial corneal burns.

During the year, Professor Smelser has sought to determine which factor in pituitary gland extracts is responsible for exophthalmos. It was found that extracts rich in exophthalmos-producing material were usually also rich in thyrotropic hormone. However, preparations of horse pituitary glands produce exophthalmos in guinea pigs, although they contain very little or no thyrotropic hormone. On the basis of this single experiment, it therefore appears that the exophthalmos factor and the thyrotropic factor are not identical, although they are undoubtedly closely related chemically.

Professor Dische has continued his studies on the thiol groups of the lens proteins. He has found that the reversible increase in the availability of thiol groups for oxidizing agents by higher pH is not accompanied by an increase in sedimentation rate or viscosity of the protein molecule. This finding indicates that the reversible changes in the availability of these thiol groups are the result of inner reversible rearrangement of the protein molecules. Therefore, this availability can be regarded as an index of the finer structure of these proteins.

By his investigations on the metabolism and chemical composition of the normal lens capsule Professor Dische has shown that in this structure there is a polysaccharide which contains only two sugars. They are galactose and glucose in the ratio of 3 to 2. This polysaccharide is not evenly distributed throughout the lens capsule and is found combined with proteins. This suggests a correlation between the concentration of glycoproteins of the lens capsule and the metabolic activity of its various parts.

Professor Seymour P. Halbert, in continuing his work on antibiotic-producing bacteria, has studied the properties and spectra of these antibiotics. He has isolated nine distinct antibiotics, most of which he found to be definitely polypeptide in nature. In collaboration with Dr. Devorah Locatcher Khorazo, he has investigated the seasonal variation in concentration of these organisms and has found a definite trend toward an increase in their numbers during the late winter months. Further studies will be made to see whether any correlation exists between the seasonal prevalence of superficial ocular infections and the fluctuations in concentration of the antibiotic producers. Experimental infections in animals are being studied to determine the pro-

tective effect of these antibiotic producers. An effort is also being made to determine whether the antibiotic activity of the ocular micrococci bears any relationship to their susceptibility to commercial antibiotics.

In the Knapp Memorial Laboratory of Physiological Optics, Professor LeGrand H. Hardy, Dr. Gertrude Rand, and Miss M. Catherine Rittler have validated their test for color vision. These plates, which are now in the process of production for civilian use, are of particular value because they enable one to assess quantitatively the color sense. Further studies on color vision are being conducted by Dr. Ingeborg Schmidt and Dr. Alexander Watson. A report on "The Investigation of Binocular Space," in which Dr. Albert Blank presents experimental evidence confirming Luneburg's theory, has been prepared.

Dr. Otto Lowenstein, in collaboration with Dr. Sean Murphy, has completed his experimental studies on pupillary light reflex pathways. In addition, he has continued his studies on pupillary changes in ocular and systemic diseases. He has shown that certain virus infections of the central nervous system, which have an affinity for the second neuron of the pupillary light reflex pathway, produce characteristic pupillographic syndromes.

Among the clinical problems that have been investigated during the past year are: the use of absorbable sutures in cataract surgery by Professor Dunnington and Dr. Ellen F. Regan; retrolental fibroplasia by Professor Reese and Dr. Herbert Wiesinger, in collaboration with Professor Richard L. Day of the Department of Pediatrics; evaluation of tonography in the diagnosis and treatment of glaucoma by Professor Willis S. Knighton and Dr. Andrew de Roetth, Jr.; ocular manifestations of thyroid disease by Dr. Robert M. Day, in collaboration with Professor Sidney Werner of the Department of Medicine; relationship of pathology of the vitreous to detachment of the retina by Dr. Joseph A. C. Wadsworth; radiotherapy on retinoblastoma and allied conditions by Dr. George R. Merriam, Jr.; tumors of the lacrimal gland by Dr. Arnold W. Forrest; and the effects of variations in the high-frequency current on the tissues of the eye by Dr. Graham Clark, in his study on the treatment of detachment of the retina.

These research studies have been financed largely through grants-in-aid from many sources. Among the donors are: The Marie Heye Clemens Fund, Inc.; The Mary W. Harriman Glaucoma Fund; Eli Lilly and Company; The Sloan Glaucoma Fund; The Snyder Ophthalmic Foundation; Mr. Nathan Straus; and The Whitehall Foundation. It is with sincere appreciation that thanks are extended to all of the benefactors for their continued support.

During the past year the following received honorary degrees: Professor Dunnington, LL.D. from Hampden Sydney College, Virginia; Professor Reese, M.D. (*honoris causa*), University of Melbourne, Australia; and Professor von Sallmann, M.D. (*honoris causa*), University of Marseille, France.

Various members of the Department have given guest lectures both in this country and abroad and have participated in local and national medical meetings.

DEPARTMENT OF ORTHOPEDIC SURGERY

Professor Alan DeForest Smith, Executive Officer

Several research projects are in active progress in the laboratory for histochemical studies. The laboratory was reorganized at the beginning of the past academic year under the supervision of Professor Raffele Lattes and under the direction of Dr. Gabriel C. Godman, both of the Department of Surgery. Dr. Godman is assisted by Dr. David P. Bloch, who was appointed as a National Research Council Fellow. Dr. Andrew Bassett is carrying out some studies in the laboratory. The Department of Medicine is taking an important part in the activities of the laboratory. Professors Charles A. Ragan, Jr., and Karl Meyer, together with Dr. Henry D. Grossfeld, are interested in problems related to the rheumatic diseases. Professor Margaret R. Murray Le Doux also has interested herself in some phases of the work and is rendering invaluable assistance by making available her tissue culture laboratory.

Three major projects are being pursued. The first is a study by Dr. Godman of the processes of regeneration and repair of striated skeletal muscle with special reference to the effects of certain agents, including cholchicine, cortisone, etc., on muscle regeneration and structure; the anatomical arrangements favoring restitution of an injured muscle; the cytochemistry of differentiation of regenerating striated muscle fibers correlating the presence and distribution of certain substances with success in stage of development in vitro and in experimental animals; and the amitotic division of nuclei peculiar to striated muscle. Active research is now in progress on all aspects of these problems and some of the phases have been completed.

The second major project is the quantitative cytochemical study of nucleic acid and protein synthesis in cultured cells during the mitotic cycle and the influence thereon of certain antimetabolite drugs. This work will be supported in part by a grant from the Jane Coffin Childs Memorial Fund for Medical Research.

The third project includes investigations on the growth and maintenance of fibroblastic and osteoblastic cells in mass culture with the following objects in view: chemical analysis for the production of mucopolysaccharides and collagen in vitro, which is being undertaken by Professor Meyer; the study of the effects of various drugs and agents on the morphology, constitution and production of mucopolysaccharide, and collagen of the cells under investigation; to ascertain the conditions for maintenance and functional differentiation of osteoblasts in vitro; and to make a histochemical analysis of fibroblasts

and osteoblasts in vitro as modified by various circumstances. The construction of facilities for this last group of experiments has been nearly completed by assignment of space in the laboratory and by allocation of funds by Professor Ragan.

Dr. Godman delivered a lecture and conducted a seminar at the Yale University School of Medicine and participated in many of the seminars of the Department of Zoology of Columbia University during the year.

Among the clinical investigations which were carried out by members of the Department during the year were the completion and publication of a method for the determination of anteversion of the neck of the femur by Drs. Charles T. Ryder and Lawrence Crane; a late end-result study by Professor Halford Hallock and Dr. James B. Jones of spinal fusion for tuberculosis; a study of the comparative results of isoniazid and ipsoniazid in the treatment of bone and joint tuberculosis by Dr. D. Keith McElroy.

Professor Frederick M. Smith and Dr. Sawnie Gaston have published an end-result study of epyphyseal injuries of the head of the radius. Professor Smith has completed a survey of the late end-results of fractures of the lateral condyle of the humerus. Dr. Charles S. Neer has analyzed the problems and results of fracture dislocations at the shoulder and developed a metallic prosthesis for replacing the humeral head.

Professors Hallock, Alan DeF. Smith, and Frank E. Stinchfield attended the joint meeting of the Orthopedic Associations of the English speaking nations at London in July. Professor Stinchfield read a paper on the indications for various types of arthroplasty of the hip. Dr. Robert E. Carroll was invited to give an address on the surgery of the hand to the Norwegian Surgical Society in Oslo in June, and later visited several orthopedic clinics in the Scandinavian countries.

Sixteen papers were published by various members of the staff during the year.

The teaching of the third- and fourth-year students in the outpatient department and on the wards was carried on as usual.

DEPARTMENT OF OTOLARYNGOLOGY

Professor Edmund P. Fowler, Jr., Executive Officer

There has been no change in the teaching of otolaryngology in the College of Physicians and Surgeons in the last year except for the formalizing of the elective course in otolaryngology.

The promotion of Dr. James W. Babcock to Clinical Professor of Otolaryngology and the appointment of Dr. Robert M. Hui as Instructor and Mr. Donald M. Markle as Lecturer are announced with pleasure. Dr. George R. Brighton has been granted a leave of absence for reasons of health.

Several members of the Department went abroad during the summer of 1952, notably Professor deGraaf Woodman, who was invited to give a paper on arytenoidectomy for bilateral abductor paralysis before the Royal Society of Medicine in Manchester, the Otolaryngological Society in Paris, the Austrian Otolaryngological Society in Vienna, and the Holland Otolaryngological Society in Amsterdam and at the University of Padua and Oxford University in England. Upon invitation, he also demonstrated his arytenoidectomy operation at St. Bartholomew's Hospital in London.

Professor Franz Altmann attended the meeting of the Collegium Otolaryngologicum in Zurich of which he is a newly elected member. He was guest of honor of the Austrian Medical Society in Salzburg, where he read a paper entitled "Morbus Ménière." Professor Fowler also attended a meeting in Zurich and presented a paper on "Hypersensitivity of Denervated Tissue." Professor Fowler was a participant of a panel on "Headache" conducted by Dr. Harold Wolff at the American College of Physicians in Atlantic City. He also gave a series of papers in Savannah, Georgia, before the Georgia Ear, Nose, and Throat Society and read a paper before the American Otological Society in New Orleans on "Procaine Treatment of Ménière's Disease."

Professor Woodman presented a new type of operation for laryngeal stenosis using a metal keel at the American Rhinological, Laryngological, and Otological Society meeting in New Orleans.

Dr. Bela Marquit presented one paper on "Rhinoplasty" and another on "The Problems of the Hard of Hearing" before the Faculty of Medicine, University of Santo Domingo, Ciudad Trujillo, Dominican Republic.

Dr. Hui was made Consultant in Otology for the Department of Health of the City of New York. He has done a survey of hearing and speech facilities in the City of New York and has been active with Mr. Donald Markle and Professor Fowler in arranging a modern program in audiology for the City of New York.

Dr. Edward Brandow, Chief Resident in Otolaryngology, presented a paper on "The Incidence of Metastases from Various Types of Laryngeal Cancer" at the Academy of Medicine, New York Section on Otolaryngology.

Under the category of work in progress, Dr. Alfred Magee of the Department of Ophthalmology has continued his studies on muscle potentials of the eye from vestibular stimulation. Dr. Franz Altmann continues his work on Ménière's Disease, acoustic neuritis, and papillomas of the larynx with cancer in situ and is directing a moving picture on "The Embryology of the Ear" for the American Academy of Ophthalmology and Otolaryngology. Professor Fowler, assisted by Dr. Radovan Pavelic, has continued work on supersensitization to the Arthus and Schwartzman reaction and to infection in rabbits and also on the effect of procaine in Ménière's Disease. Under a grant from the United States Air Force, with the assistance of Dr. Nathan Kline of the Department of Neurology, he is establishing thresholds of vestibular

stimulation. Dr. Adolf Zeckel of the Department of Psychiatry continues his studies on the psychosomatics of Otolaryngology, particularly of Ménière's Disease and Otosclerosis. A film, made last year with Dr. Jean Baron of Paris, on "The Use of Prismatic Glasses in Vertigo" received a French Government prize for medical cinematography.

As in previous years the Department has been visited by many specialists of this country and from abroad. The main criticism came from those from abroad—they felt that although the Department is an outstanding one, insufficient time was spent with the medical students in ear, nose, and throat to properly equip them for general practice. They should have more teaching in the outpatient clinic and operating rooms and some time on the wards.

DEPARTMENT OF PATHOLOGY

Professor Harry P. Smith, Executive Officer

The Department of Pathology is pleased to note favorable response to its views on medical education as expressed in its section of the Dean's Report of a year ago. It is gratifying that several other sections of his report also stressed the view that the first two years of the medical curriculum should provide fundamental education in the medical sciences and should not be diluted by extraneous matters.

The Department of Pathology wishes to stress its belief that a course in pathology should provide an integration of the basic sciences and should describe disease in the languages of physiology, biochemistry, and microbiology and not in terms of anatomy and histology alone. Our Department has already made large strides in this direction; additional progress along these lines was made in the past year. A course in pathology that stresses integration permits the student to enter directly into the clinical clerkships of the third and fourth years with a minimum need for didactic instruction on the part of the clinical staff. This viewpoint has the wholehearted endorsement of the students themselves.

As stated in earlier reports, the Department is subdivided into the divisions of general pathology, neuropathology, pediatric pathology, orthopedic pathology, and chemical pathology. The activities of these divisions have progressed in a gratifying manner during the past year despite the shortage of personnel in some areas.

In the division of general pathology, Professors Joseph E. Flynn and Robert W. Coon made outstanding progress in studies on the fundamental principles of blood coagulation. They base their new work on the fundamental fact that thromboplastin sediments readily at high speed centrifugalization. Their own important contribution lies in their discovery that the "stable" factor, "labile" factor, and ionized calcium interact with thromboplastin to form certain

intermediates needed for the next steps of coagulation. These intermediates, they find, can also be isolated by centrifugalization. Prior to their work, it was known merely that these various factors interact in some undetermined manner with each other, and with prothrombin. It is now possible to specify the exact sequence of the interaction and to isolate and purify the more important intermediates. More work is needed to complete the purification and chemical identification of these compounds. However, the work of Professors Flynn and Coon provides a blueprint of the chemical mechanics of coagulation.

Professor Joseph Seronde, Jr., has continued his experiments on the physiological inactivation of thrombin. In collaboration with Professor Theodore F. Zucker, he has also initiated a project concerning the role of pantothenates in the resistance of animals to certain microorganisms. It was found that rats on a diet deficient in pantothenates develop pulmonary lesions spontaneously or when inoculated with a certain corynebacterium. Control rats on a complete diet are not susceptible. It is of interest that the same organism produces lesions in mice even when the diet is presumably complete.

Professor Wellington B. Stewart has continued his investigations of iron metabolism. He has completed a series of studies showing the effect of hemolytic anemia on iron absorption in dogs. He is also collaborating with Professor Maurice E. Shils of the School of Public Health on the effect of dietary factors upon the absorption of iron. Factors affecting the life span of canine erythrocytes are also being studied.

The activities of the division of neuropathology continue under the supervision of Professors Abner Wolf and David Cowen. The division assumes responsibility for autopsies from the Neurological Institute and for all surgical specimens from the Department of Neurological Surgery. Professors Wolf and Cowen conduct a special neurological conference each Wednesday afternoon for the combined neurological and neurosurgical services of the Institute. Conferences are also held each Wednesday for the resident staff of the Neurological Institute. Residents in neurology are assigned to the division of neuropathology for instruction in gross neuropathology. This work is supplemented by lectures and demonstrations in gross and microscopic neuropathology carried out for the benefit of the resident staff of the Neurological Institute.

Drs. Fred Boykin and Christopher Iannucci and Professors Cowen and Wolf have completed a study on subependymal glomerate astrocytomas. Dr. Leonard Berg, in collaboration with Professors Cowen and Wolf, has studied the production by leishmaniasis of amyloidosis in the golden hamster. They have devised experimental procedures which lead to amyloid deposition in the peripheral and central nervous system. Professor Wolf gave a report on human demyelinating diseases at the First International Congress of Neuropathology held in Lisbon.

Professors Irwin Feigin and Wolf have reported on chronic Wernicke's

encephalopathy in children and have considered the possibility that it may be due to a congenital biochemical defect. Dr. Stanley Aronson and Professor Wolf, in collaboration with Professor Rhoda W. Benham of the Department of Dermatology, have reported on maduromycosis of the central nervous system. Dr. Katherine Kirby has conducted special studies on a large series of brain stem gliomas. Dr. James Austin has continued his studies of peripheral neuropathies and their familial features.

The division of pediatric pathology reports a continued increase in the number of autopsies and surgical specimens. The staff has consisted of Professor Beryl Paige, who will retire in July, Professor Dorothy H. Andersen, and Dr. Henry Dunn. Research on the celiac syndrome has been carried out in the pathology laboratory by Professor Paul di Sant'Agnese. Work on thiamin deficiency has been conducted by Dr. Ruth Alice Davis. Professor Andersen and Professor di Sant'Agnese have prepared a chapter on celiac disease in Brenneman's *Practice of Pediatrics*. They have also published an original article on idiopathic celiac disease.

The work on cystic fibrosis has shown that both sweat glands and salivary glands in afflicted individuals produce a secretion containing an excess of sodium chloride. This finding helps to explain the heat prostration which sometimes occurs in afflicted children. Recent work on celiac disease and on adult sprue shows that these diseases occur in the same families and sometimes in a single individual; each is based on a familial metabolic abnormality.

Professor Andersen was one of the guest speakers at the meeting of the Texas State Pediatric Society in Dallas. She also presided at a round table on the celiac syndrome, which was held at the meeting of the Academy of Pediatrics in Chicago in October, 1952. She was the recipient of a citation from Mt. Holyoke College at their Convocation on "Science and the Humanities" in October, 1952.

The division of orthopedic pathology reports an eighteen per cent increase over last year in the number of surgical specimens received. This has proved to be a valuable supplement for the weekly pathological conferences held in conjunction with the Department of Orthopedic Surgery. Professor C. Zent Garber, who is in charge of orthopedic pathology, reports the chemical synthesis of a compound found in association with giant cell tumors. Preliminary tests on experimental animals indicate that foreign body reaction can be obtained. The reactions are rather mild in nature but are prolonged in certain cases. Professor Garber has also continued his studies of the effect of hemorrhage on the production of certain types of bone lesions. He has carried out studies on the healing of bone transplants and factors affecting the rate of healing. He and Dr. Balu Sankaran have studied the use of mercury suspensions as an aid in radiographic studies of small vessels in anatomic specimens. Dr. Bernard Cooperman has carried out studies on the effect of radiation on bone healing in the experimental animal.

Professor Theodore F. Zucker and Dr. Lois M. Zucker, of the division of

chemical pathology, have continued their studies on the toxic effects of the cancer-producing compound, acetylaminofluorene (AAF). These toxic effects can be eliminated by inclusion in the diet of countertoxic factors present in yeast, milk, or liver. The responsible countertoxic substance appears to be rather unstable when concentrated from raw materials; nevertheless, it has been possible to obtain concentrates approximately fifty times as potent as the raw material itself. It is of interest that AAF causes the accumulation of large amounts of cholesterol in the adrenal gland and that the countertoxic factor prevents this. However, it does not prevent the formation of cancer in the experimental animal.

Professor Henry S. Simms, with the assistance of Dr. Charles R. Harmison, is working on the chemical aspects of arteriosclerosis. They have confirmed their earlier work to the effect that "lipfanogens" promote the deposition of lipids in vessel walls. They find that "antilipfanogens" combine with lipfanogens, thus neutralizing their deleterious action. They find, moreover, that an increase in cholesterol results in deposition not of cholesterol, but of stainable fat.

Dr. Benjamin N. Berg collaborating with Professor Simms has obtained data from autopsy material on a large number of rats of all ages that have lived under carefully controlled, uniform conditions. The results show that the injuries in disease accumulate at a progressively faster rate as the animals grow older. Professor Simms believes that this cannot be accounted for by change or by the predisposing effect of one injury upon another. It is thought by these workers that the evidence indicates the existence of an "aging factor," the nature of which is unknown.

Dr. Hans Kaunitz has continued his research in collaboration with Dr. Charles A. Slanetz of the division of animal care. The work was supported in part by the newly formed Institute of Research in Animal Diseases, and also by funds from the Williams-Waterman Fund of the Research Corporation. Noteworthy was their study of riboflavin deficiency and the influence of protein and fat levels on the deficiency state. They have also continued their studies on the existence of a vitamin A-like factor in lard. The existence of this factor is masked by the presence of unsaponifiable substances which interfere with spectral and chemical assays. This interference accounts for the apparent absence of such vitamins in lard.

DEPARTMENT OF PEDIATRICS

Professor Rustin McIntosh, Executive Officer

As was stated in the report for academic year 1951–1952, certain changes in the teaching program in pediatrics were instituted in June, 1951, which greatly modified both the third- and fourth-year courses. Third-year work

was at that time abruptly altered in the sense that lectures to the entire class were abandoned, while in their place were substituted casework teaching in smaller groups and an earlier exposure of the student to actual clinical responsibility in outpatient care. Fourth-year teaching time in pediatrics was cut from two months to one month for each student, the single month being devoted to a hospital clerkship in which the student serves as apprentice to the ward resident. In the Dean's report last year it was possible to evaluate the revised third-year course and to compare it favorably with the old-style indoctrination by lecture and quiz section. This year it becomes practicable to judge the modified fourth-year course as experienced by students who have been exposed to the more recent and more tutorial introduction to pediatrics through casework in small groups with a high numerical ratio of instructors to students.

There is no question that the net result of the change is a gain in understanding and in competence on the student's part. While it is neither possible nor desirable to make specialists of undergraduate medical students, one may properly aim to familiarize the student with the anatomical, physiological, and psychological attributes of health in children at various ages from birth through puberty, to lead him to recognize at least some of the stigmata of impaired health, to have reasonable familiarity with common disease pictures, to know how to evaluate them and to gauge the patient's response to them and, finally, most practical of all, to recognize trouble when it is brewing and to know what steps to take in order to arrive at an orderly solution of the difficulty. The continuing burden of the teaching load, which derives from the more personal and intimate techniques of the teaching that is employed, imposes a heavy demand on the instructional staff. At the same time, the strain is mitigated to some extent by the increased interest in pediatrics displayed by students.

The resignation of Professor Beryl H. Paige, to take effect on June 30, 1953, has been accepted with great regret. Professor Paige first joined the staff of the Babies Hospital pathological laboratory in 1929 as assistant to Dr. Martha Wollstein. On Dr. Wollstein's resignation in 1935, Professor Paige was promoted to become Pathologist to Babies Hospital, a position which she has held with distinction and which she is unfortunately obliged to relinquish for reasons of health. Her contributions to the understanding of disease processes and to the appreciation of normal phenomena have been numerous and cover many aspects of the general field of human biology. Perhaps most notable was her recognition of the first case of infantile toxoplasmosis to be described in this country—an observation which gave a signal impetus to the study of this protozoal infection. All of her work has been characterized by careful attention to detail and by critical evaluation of evidence. The entire pediatric staff shares the hope that with her retirement and with the freedom from the responsibilities of her professional position will

come an improvement of health and an opportunity for enjoyment of well-earned leisure.

In the past several years it has not been practicable to make use of the undergraduate teaching facilities in pediatrics provided at St. Luke's Hospital, and in the light of current teaching trends there seems little likelihood of their being put into operation for Columbia students in the foreseeable future. Therefore, the decision was reached more than a year ago to recognize the actualities of the situation and, after suitable notification, to withhold recommendation for reappointment to the Columbia teaching staff of the three members of the St. Luke's pediatric attending staff who have in the past carried the burden of this part of the outlying teaching program. It is only proper, therefore, that at this time due thanks be expressed to Professor Herbert F. Jackson and Drs. Harold W. Dargeon and Gertrude H. B. Nicolson for the faithful service they have rendered to Columbia over the years, generously contributing their time, their spirit, and their art with no remuneration save the knowledge that in playing their part in the education of oncoming generations of pediatricians they have promoted the general welfare.

Dr. Alice F. Goodfellow, who held the Koplik Scholarship, completed her assignment as Assistant on the full-time staff and left to accept a position in the Hospital for Sick Children, Toronto. Dr. Henry G. Dunn, holder of the Holt Fellowship, has been appointed Resident Pediatrician in the Vancouver General Hospital in British Columbia. Three members of the staff who were granted leaves of absence for military service, are Drs. Rodman Gilder, Jr., William E. Homan, and Robert West.

New appointments include those of Drs. William A. Bauman, Ruth A. Davis, and Mary R. Richards as Assistants; Dr. Katherine Sprunt as Research Associate, and Grace Leidy as Research Assistant.

Professor Hattie E. Alexander's experiments in the genetics of various bacterial species have clarified certain observed phenomena and at the same time have opened up new channels of investigation. Together with Miss Leidy, she has thrown fresh light on the phenomenon of induction of resistance to streptomycin in Haemophilus influenzae and has made additional observations on the in vitro production of new strains of this organism. Professor Dorothy H. Andersen completed and published a survey of neoplasms encountered in infants and children who had been under care in Babies Hospital. Professor John Caffey made a clinical and roentgenological study, extending over a period of many years, of three cases of a rare disease—chondroectodermal dysplasia. He also described his observations on the natural regression of so-called pulmonary cysts in early infancy, proving that in a great many situations in which some authorities had claimed surgical intervention to be indispensable, conservative observation has resulted in complete cure.

Professor Richard Day, in collaboration with Dr. William A. Silverman, Professor Algernon B. Reese and others from the Department of Ophthalmology, has continued the painstaking and critical search for the cause of retrolental fibroplasia which has occupied this interdepartmental team for the past several years. A valuable by-product of interest predominantly for pediatricians has been the development of an accurate and sensitive method for measuring bone growth of premature infants over short intervals of time, thus making it possible to evaluate the growth-promoting or growth-retarding effect of various agencies such as hormone preparations. Professor Day's studies of pressure-time relations in the safe correction of pulmonary atelectasis in experimental animals, mentioned in last year's report, have been pursued with encouraging results for their possible application to infants. Professor Paul A. di Sant'Agnese, together with Professors Andersen, Robert C. Darling of the Department of Physical Medicine and Rehabilitation, and George A. Perera of the Department of Medicine, has shown that the susceptability of patients suffering from cystic fibrosis of the pancreas to various forms of "heat stroke" in circumstances of high environmental temperature is dependent upon an innate abnormality of the electrolyte composition of the sweat. Preliminary observations suggest that the high salt content of sweat is genetically transmitted, being found not only in patients with pancreatic fibrosis but also in symptom-free siblings and other direct relatives.

Dr. Ruth C. Harris' application of a battery of liver function tests to patients of young age groups has defined more clearly the limits of normal performance and has thus rendered the interpretation of these tests more informative in circumstances of illness. Dr. Mary Richards has succeeded to the direction of the long-term study of factors occurring during pregnancy which affect the integrity of the fetus. Professor Conrad M. Riley reported additional observations made on a group of patients with familial autonomic dysfunction, a syndrome which he and others first described in 1949. His program in experimental therapy of the nephrotic syndrome continues to be active, and, in addition to the application of various pharmaceutical preparations, includes a trial of group psychotherapeutic interviews with parents of patients. He has also published a booklet which explains the disease in lay terms and which has proved to be of help in the management of the over-all problem. Dr. Silverman has applied the life-table technique to the study of mortality in premature infants, thereby making provision for valid comparison of one method of care with another. Dr. Katherine Sprunt is investigating the use of chemical agents in the induction of genetic changes in filterable viruses.

Donations in support of investigations have been received from the Association for the Aid of Crippled Children; The Department of Health of New York State; Mead, Johnson, and Company; the National Foundation for Infantile Paralysis; Lederle Laboratories; the Nephrosis Research Fund, Inc.;

Playtex Park Research Corporation; the Rockefeller Foundation; the United Fruit Company; and the National Institutes of Health; and the Public Health Service of the United States Government. For all of this generosity due thanks are expressed.

The twenty-nine publications from the Department in the course of the year include two books and one pamphlet.

DEPARTMENT OF PHARMACOLOGY

Professor Harry B. van Dyke, Executive Officer

The continued great demand for pharmacologists as educators and investigators accounts in part for resignations from the Department during the academic year 1952–1953. In the summer of 1952, Professor George B. Koelle moved to Philadelphia to take up his duties as Professor of Pharmacology in the School of Graduate Medicine of the University of Pennsylvania. Dr. Rose G. Ames moved to Washington, D.C. Dr. Everett W. Maynert resigned to accept a position in the Department of Pharmacology of the Johns Hopkins University School of Medicine. Dr. Elizabeth D. King resigned from a Research Fellowship sponsored by the United States Public Health, and is now working in the Army Medical Research Laboratory at Fort Knox, Kentucky. Owing to the pressure of other duties, Dr. Fredrick F. Yonkman, who has served as a Lecturer in the Department since 1944, resigned at the end of the academic year. Dr. Paul Brazeau, who earlier had worked as a Fellow in the Department, was appointed as Instructor. Dr. William W. Douglas, a member of the staff of the National Institute for Medical Research at Mill Hill in London, was granted a leave of absence to serve as an Associate in the Department during the academic year. Dr. Herbert J. Bartelstone was appointed an Assistant Professor of Pharmacology. Two foreign fellows, particularly interested in furthering their knowledge of American teaching methods in pharmacology, joined the Department for the year 1952–1953. The fellowship of Dr. Bidhu Bhushan Roy of Calcutta, India, was sponsored by the World Health Organization and that of Dr. Alfonso Matallana of Bogota, Colombia, by E. R. Squibb and Sons.

Although the fundamental pattern of teaching pharmacology to second-year students of medicine and dentistry was not changed in 1952–1953, attempts to improve the course were instituted in accordance with the long-range policy of the Department. An important step forward was the appointment of Professor Herbert J. Bartelstone whose special knowledge of the problems of dental education enabled the Department to strengthen greatly the program of instruction for dental students. Demonstrations and lectures in fields requiring specialized knowledge were made possible by the cooperation of members of other departments of the College. Such aid in teaching a

well-rounded and adequate course was generously given by Professor Virginia Apgar and Dr. William S. Howland of the Department of Anesthesiology, Professor Sidney Carter of the Department of Neurology, Professor John W. Fertig of the School of Public Health, and by two members of the Department of Medicine, Professor Alfred Gellhorn and Dr. John R. West. The course in applied pharmacology for medical students of the fourth year was again offered as a cooperative course of the Departments of Medicine and Pharmacology under the supervision of Professors Alfred Gilman and Hamilton H. Southworth.

New aspects of the functions of the neurohypophysis were investigated by Professor Harry B. van Dyke in a continued effort to identify the secretory products of the gland in response to a variety of stimuli. An extremely sensitive method for determining the oxytocic principle by measuring changes in the pressure of milk in the lactating mammary gland has been worked out as a practical method. Some of the difficulties of estimating the antidiuretic hormone by a modified intravenous method have been removed. Mr. Kalman Greenspan collaborated with Professor van Dyke in many of the experiments. In association with Professor Vincent du Vigneaud, of Cornell University College of Medicine, and others, Professor van Dyke studied the pharmacology of pure antidiuretic hormone and pure oxytocin. The former was shown to have a definite oxytocic action, whereas oxytocin had no significant antidiuretic action.

Professor Gilman and Dr. Brazeau have continued their studies on renal tubular function. They have presented evidence that the reabsorption of bicarbonate ion throughout the length of the tubule is accomplished by the transport of hydrogen ion from tubular cell to tubular urine. Moreover, the magnitude of hydrogen ion transport is determined by the carbon dioxide tension of the arterial blood.

Professor Bartelstone has extended his investigation of the salivary secretion of anions by employing the radio-isotope of iodine, I^{131}. His research in this field is continuing in a new laboratory in the Radio-isotope Division of the Veterans Administration Hospital in the Bronx.

Dr. Ames completed her investigation of the function of the antidiuretic hormone in the water metabolism of both full-term and premature infants. She found that postnatal age rather than the degree of maturity at birth determines the rate of development of renal function as far as the excretion of water is concerned.

In carrying forward studies of the metabolism of hypnotic and anticonvulsant drugs, Dr. Maynert and Miss Janet E. Washburn described new chemical properties of derivatives of barbituric acid. Other metabolic aspects of the work are being completed by Dr. Maynert in the Johns Hopkins University School of Medicine.

The mechanisms of temperature regulation and the manner in which they

are modified in certain animals have been investigated by Dr. Douglas. Particular attention has been given to pyrogen-induced fever and to the hypothermic effect of adrenocorticotrophic hormone, ACTH. Pyrogen-induced fever appears to be more complex than had formerly been believed. The hypothermic action of ACTH, manifested in the rabbit but not in the dog, depends in part upon the hormone's action on the thermotaxic center; in addition, there is evidence that ACTH can exert a hypothermic action by reducing metabolic activity which normally is raised in an environment of low temperature.

Among the distinguished foreign scientists who visited the Department during 1952–1953 were Professor R. B. Arora of Jaipur, India; Professor W. Heubner of the Free University, Berlin; Professor J. M. Munoz of the University of Canca, Colombia; Professor A. Pekkarinen of the University of Turku, Finland; and Dr. G. Wolstenholme of the Ciba Foundation in London.

The members of the Department made numerous contributions to other scientific activities either within the College or elsewhere. These included lectures in educational institutions or hospitals and before scientific societies. Professor Bartelstone spoke before the Federation Dentaire Internationale at its meeting in London. Professor Gilman continues to serve on the Pharmacology Study Section of the U.S. Public Health Service and on the editorial boards of the *American Journal of Physiology, The Journal of Applied Physiology,* and *Pharmacological Reviews.* He is also a member of the committee which is planning the first of a series of teaching institutes that will be held under the auspices of the Association of American Medical Colleges in October, 1953. The first institute will deal with the teaching of physiology, biochemistry, and pharmacology. One delegate from each medical school will represent the three departments. Professor van Dyke was editor of *The Journal of Pharmacology and Experimental Therapeutics* until his term of office expired in the spring of 1953. He is a member of the Committee on Growth of the National Research Council and serves as Chairman of the Section on Endocrinology of that Committee. He has been appointed to represent the American Society for Pharmacology and Experimental Therapeutics in the National Research Council.

DEPARTMENT OF PHYSICAL MEDICINE AND REHABILITATION

Professor Robert C. Darling, Executive Officer

The academic year 1952–1953, the first complete year in the existence of Physical Medicine and Rehabilitation as a separate department, was characterized by the consolidation of some of the gains achieved through the es-

tablishment of such a department and by the closer affiliation between the Institute for the Crippled and Disabled and Columbia University and the Presbyterian Hospital.

Orientation of undergraduate students to the techniques and scope of rehabilitation has continued by teaching in collaboration with other departments. A more intensive approach for specially interested students is made possible by the National Foundation for Infantile Paralysis which offers a subsidy for a special summer clerkship program. Last summer one student from another medical school spent a profitable two months here on such a fellowship. This year six students have received fellowships and have been accepted for the more organized summer course. This approach seems to be the only one available to stimulate students' interest at an early stage in their careers.

The authorized quota of four physicians participated in the Baruch fellowship program throughout the year. In addition, one special student from Puerto Rico spent eight months in practical and basic training of a similar nature. Two Baruch fellows completed their training in the past year. Dr. Olav Austlid was appointed Assistant Director of the Physical Medicine Department at the Hospital for Special Surgery; Dr. Adeline Gauger returned to the California State program at Pacific Colony, Spadra, California. The program for the current residents now includes instruction in the basic sciences, partly with the orthopedic surgery course in basic science and clinical experience in the broad scope of activities at the Medical Center and the Institute for the Crippled and Disabled.

Two more offerings of the postgraduate course in cerebral palsy were given under the sponsorship of the Coordinating Council for Cerebral Palsy in New York City, Inc. A total of 7 physical therapists, 18 occupational therapists, and 2 physicians completed the course. These add very significantly to the small number of trained workers in this undermanned field. In this course, the Department is greatly indebted, as it was during the previous offering, to the several collaborating treatment centers in the New York area which have contributed so much to the practical phases of the teaching program.

The Institute for the Crippled and Disabled continues to sponsor educational programs for community groups concerned in rehabilitation. One of the most significant of these programs was a full-day session on industrial hand disabilities offered to insurance workers. In addition to group demonstrations, the Institute furnishes individual experience in the form of apprentice teaching in the fields of vocational counseling, social work, psychology, and the manufacture of orthopedic appliances.

Professor Robert C. Darling and Miss Ethel Shea, in collaboration with Professor Paul di Sant'Agnese and others in the Department of Pediatrics, have continued their studies on abnormalities of the sweat in fibrocystic di-

sease of the pancreas. The inability of patients suffering from the disease to conserve sodium chloride in this secretion has been firmly established. It would appear that the difficulty lies in the sweat glands themselves, which are functionally disturbed along with many other glands of the body. Furthermore, there is a strong suggestion that the sweat abnormality occurs in the families of these patients.

Work has been begun by Professor Darling and Miss Shea under contract with the Veterans Administration to explore the possibilities of significant creatinurea in amputees. Also, preliminary tests have been started in collaboration with Professor Robert L. Levy of the Department of Medicine to utilize the treadmill as a cardiovascular test device.

Dr. Milos J. Lota is continuing the development of apparatus for precise physiologic measurements. A beginning is being made in the study of the effect of ultrasound on the permeability of the red cell membrane.

Mrs. Marion S. Lesser and Professor Darling are completing the writing of the report on a follow-up study of former patients of the Institute for the Crippled and Disabled. The amount of significant material emerging from this study is so large that its organization for publication has been a major task.

Professor Edward E. Gordon assumed his full-scale duties as Medical Director at the Institute for the Crippled and Disabled on July 1, 1952. His presence there as a full-time director has greatly facilitated the function of that center in patient care, teaching, and research. He spends one day a week at the Presbyterian Hospital as a clinic attending physician as well as on consultations on those hospital patients needing the services of the Institute.

In the past year, with a team of two other professional workers from the Institute, Professor Gordon attended a course on upper extremity devices under the auspices of the National Research Council given at the University of California at Los Angeles. This course, together with long experience at the Institute, furnishes the basis for a continuing study program on this subject. Under a grant from the National Tuberculosis Association, Professor Gordon has carried on research on the oxygen consumption in several tasks applicable to convalescing tuberculous patients. The results are being prepared for publication.

Professor Darling lectured on "The Broad Approach to Rehabilitation" at the 38th Annual Convention of International Associations of Industrial Accident Boards and Commissions. This lecture is published in the proceedings of that organization. In collaboration with Professor Gordon, he presented exhibits showing the philosophy and methods of the Institute for the Crippled and Disabled at several scientific meetings.

Professor William B. Snow has continued and added to his important clinical duties in the Medical Center and the community. He is an active consultant to the cerebral palsy special classes in Public School 85 in New York

City and to the House of St. Giles the Cripple. He is a member of the Coordinating Council for Cerebral Palsy in New York City, Inc., of the Orthopedic Advisory Committee of the New York City Department of Health, and of the Medical Advisory Committee of Visiting Nurse Service of New York. Dr. Snow is President-Elect of the American Congress of Physical Medicine and Rehabilitation, and will take office as President in September, 1953.

Professor A. David Gurewitsch added to his clinical responsibilities by being appointed Medical Director of Blythedale Hospital, Valhalla, New York. For several months of the year, he assisted in the reorganization of the Physical Therapy Clinic at the Institute for Physical Medicine and Rehabilitation, New York University–Bellevue Medical Center. He will be inspecting and lecturing at the Rehabilitation Center in Belgrade, Yugoslavia, in June, 1953. Assistant Professor Morton Hoberman is Vice President of the New York Society of Physical Medicine. He participated in the Panel Discussion of Poliomyelitis at the annual meeting of the American Medical Association in June, 1953.

OCCUPATIONAL THERAPY

The academic year 1952–1953 opened with a total of 76 students, of whom 31 were in clinical affiliation. The 45 students in residence represented a reduction in admission of 5 students as compared with the academic year 1951–1952. Four students withdrew during the year due to low academic records or changes in professional plans.

Of the group in clinical affiliation, 21 successfully completed the registration examination of the American Occupational Therapy Association. Sixteen of the 21 have accepted positions. Nine will write the registration examination in June.

There is a significant and somewhat alarming trend in the decreasing number of students applying for admission. This is clearly traceable to the complete lack of opportunity for scholarship assistance in this field and the present high cost of education. The immediate effect of this trend is that less opportunity for student selection is possible.

It is with profound regret that the school accepted the resignation of Professor Martin De Forest Smith from the instructional staff. Professor Smith served as instructor in general medicine for ten years—since the beginning of the school. He earned the deep respect and devotion of all staff members and students for his untiring efforts, interest, and able instruction. In addition, The Department accepted regretfully the resignation of Dr. Donald King of the Department of Pathology, who worked with our students for two years; Dr. Charles W. Findlay, Jr., of the Department of Surgery, who worked with us for two years; Mr. Willie H. Hinely, from Teachers College, who instructed in woodwork and metalwork for five years; Mr. John Opper, from Teachers College, who instructed in design for two years.

The Department has been happy to welcome to the teaching staff Dr. Philip S. Vassar of the Department of Pathology; Dr. John A. Wood of the Department of Medicine; Dr. Olav Austlid, Assistant Director, Department of Physical Medicine, Hospital for Special Surgery, who instructed in kinesiology; Miss Gladys Jameson, who instructed in kinesiology; Miss Gertrude Ambrose, who instructed in therapeutic exercises; Mr. Yasha Lisenco from Teachers College, who instructed in woodwork and metalwork; and Miss Margaret Stark from Teachers College, who instructed in design.

Two noteworthy changes were made in instructional patterns this past year. In anatomy, the number of laboratory periods was doubled with one-half of the laboratory time spent in demonstration by the instructor and the other half spent in further investigation by the student. This permitted smaller laboratory groups and afforded opportunities for participation by all. The course offering in kinesiology was completely revised—weekly lectures are presented to the total group enrolled, and four separate laboratories are provided, each of which are used by twenty students. The school feels that these two changes have been most beneficial and have provided improved instruction for the students. There have been, in addition, a few minor changes of content in individual courses, and several others are planned for next year.

During the past two or three years we have seen the development of increasing opportunities for student participation in courses. Several courses are now including as part of the instructional techniques panel presentations by the students. These have been beneficial in giving students an opportunity to gain poise and ease when speaking to a group, to learn to sift and organize material for presentation within time limits, and to learn more about sources of material. We have seen decided improvement in speaking and organizational ability since these teaching techniques have been put into effect.

Clerkships have again demonstrated their value as an integral and important part of the student training program. Students in the Psychiatric Clerkships have again used the facilities of the New York State Psychiatric Institute and Hospital, Psychiatric Division of Bellevue Hospital, and the Payne Whitney Psychiatric Clinic of New York Hospital. Since adequate coverage for our students in the general medical and surgical clerkships could not be obtained through Bellevue Hospital and the Columbia-Presbyterian Medical Center Hospitals alone, we were fortunate in being allowed to schedule students also in the occupational therapy departments of Goldwater Memorial Hospital and the New York Hospital. The clerkship in physical disabilities has been scheduled as usual at the Institute for the Crippled and Disabled. To the directors and occupational therapy staffs of all of the above institutions go warm thanks for their indispensable assistance in the student training program.

During the year, 45 students have received clinical training in 40 different

hospitals or agencies. The following centers, previously used regularly, are not being used at present: Children's Hospital, Buffalo, New York; Emory University Hospital, Emory University, Georgia; The City Hospital, Welfare Island, New York. New centers to which students were assigned included: The Community Workshops of Rhode Island, Inc.; Graduate Hospital of the University of Pennsylvania; New York Hospital (Main Hospital), New York City. Although not on the regular list of training centers, the following facilities were used when special scheduling became necessary: The Delaware Curative Workshop, Wilmington, Delaware; Buffalo State Hospital, Buffalo, New York; St. Elizabeth's Hospital, Washington, D.C.; Boston State Hospital, Boston, Massachusetts; Rockland State Hospital, Orangeburg, New York; The United States Public Health Service Hospital, Boston, Massachusetts.

The occupational therapy program is deeply indebted to the above institutions and to the personnel of the occupational therapy departments for their continued help in making the education of students a meaningful experience.

During the 1951–1952 school year the students in occupational therapy requested permission to function under an honor system. Permission was granted, an Honor Board with representation from each class was established, and details were worked out. The honor system has now been in operation for a full year and it is felt that it has been very successful. Not the least among the benefits of this form of increased student responsibility have been an improvement in class attendance and a more informal, relaxed relationship between the student body and the staff of the administrative office.

We have had student membership on the Student Liaison Committee of the New York Occupational Association. This committee, whose chairman is a registered therapist, was inaugurated for the purposes of keeping the student bodies of both New York University and Columbia University informed of professional developments and increasing interaction between the students of the two schools of occupational therapy in New York.

Rather than make a Yearbook as had been done previously in printing class, the students elected to do other projects. The advanced standing class prepared a handbook of suggestions for new students, while the senior class printed an address book of the total student body and a booklet of directions for pinhole photography.

The annual reception in honor of the graduating class this past year was held in October rather than at the end of December. This seemed to be a preferable time and will be continued. Dr. Henry Kessler, Director of the Kessler Institute for Rehabilitation, West Orange, New Jersey, was invited to give the main address and gave a warm and inspiring message to the class and their friends.

The following figures compiled from the 1953 Yearbook of the American Occupational Therapy Association are interesting. Of the 294 graduates

from this school, 223 have maintained professional registration and 142 are presently working. Of the working group 75 are employed in supervisory positions, including 6 who are in administrative positions in training schools; 2 are in Italy on Fulbright Fellowships; 1 is in Japan; 1, in Scotland; 3 are doing volunteer work; and 9 are working in areas other than occupational therapy *per se*.

In cooperation with the Coordinating Council for Cerebral Palsy in New York City, Inc., the school again offered two three-month courses in cerebral palsy to physicians and physical and occupational therapists. Eighteen of the registrants were occupational therapists, of whom 11 had had some working experience with cerebral palsy. This program suffered a serious loss in the resignation of Miss Anita Slominski, who was occupational therapy coordinator for the cerebral palsy course.

We have been privileged to bring to our students during the past year several guest lecturers who are leaders in their respective fields: Professor Frieda Behlan, Curriculum Director of Occupational Therapy, New York University; Dr. Hyman Brandt, Research Consultant, American Occupational Therapy Association; Miss Marjorie Fish, Executive Director, American Occupational Therapy Association; Miss Margaret B. Helmle, Director, Rehabilitation Service, Brooklyn Tuberculosis and Health Association; Professor William A. Horwitz of our Department of Psychiatry; Mr. Karl G. Kaffenberger, District Supervisor, Division of Vocational Rehabilitation, New York State Education Department; Dr. Henry H. Kessler, Director, The Kessler Institute for Rehabilitation; Professor Nolan D. C. Lewis of our Department of Psychiatry; Miss Martha Matthews, Educational Director, American Occupational Therapy Association; Mrs. Lucie Spence Murphy, Editor, *The American Journal of Occupational Therapy;* Mr. Charles Ritter, Consultant, Special Aids and Appliances, American Foundation for the Blind; Dr. Morton A. Seidenfeld, Director, Division of Psychological Services and Public Education, National Foundation for Infantile Paralysis; and Dr. Orpha Thomas, Associate Professor of Home Economics, Teachers College, Columbia University.

In addition, the students enjoyed the privilege of visiting many of the hospitals and institutions of the metropolitan area. During such visits the students were addressed by the directors of the institutions and heads of departments. Among the field trips were visits to the Manhattan State Hospital, Girls Camp, Institute of Physical Medicine and Rehabilitation, Altro Workshops, Public School 135, Mobility, Inc., Bronx Veterans Administration Hospital, and the Curative Workshop of the Veterans Administration Regional Office.

Miss Marguerite Abbott is a member of the Board of Managers and the Research Committee of the American Occupational Therapy Association, of which she is also Speaker of the House of Delegates. She is Division Editor

of the *American Journal of Occupational Therapy*. In addition, she is a member of the Board of Managers and the Research Committee of the New York Occupational Therapy Association. During the year, Miss Abbott published a revised manual, "Syllabus of Treatment Techniques for Cerebral Palsy," another manual, "Administration and Organization of Cerebral Palsy Facilities," and an article, "Professional Cerebral Palsy Training for Occupational Therapists," in the *Cerebral Palsy Review*.

Miss Edith H. Brokaw published an article, "The Evolution of a Multi-Loom," in *The Handweaver and Craftsman*.

Professor Marie L. Franciscus is a member of the Central Education Committee, the Committee on Schools and Curriculum, and the Registration Committee, all of the American Occupational Therapy Association and is Associate Editor of the *American Journal of Occupational Therapy*. She is also a member of the Board of Managers and Chairman of the Personnel Policies Committee of the New York Occupational Therapy Association. Professor Franciscus published "The Cerebral Palsied as a Person" in the *Cerebral Palsy Review*.

Miss Virginia Kilburn is Chairman of the Research Committee of the New York Occupational Therapy Association.

PHYSICAL THERAPY

During the academic year 1952–1953 the total of 53 students was enrolled as follows: 28 with advanced standing; 9 as seniors; 14 as juniors; 2 as special students (to complete previously interrupted training or to make up deficiencies). Four of the advanced standing students withdrew shortly after the completion of the Winter Session. The seniors will complete their final month of clinical practice during June at the New York State Rehabilitation Hospital, West Haverstraw, New York. The advance-standing students will be graduated at the end of August, having completed three months of clinical training (each student having attended three different installations). The juniors have been scheduled as previously for a two-month clerkship this summer.

Careful re-examination of the course schedules and their contents was undertaken to achieve proper emphasis for the current needs in the profession and also to make the course names and descriptions more informative. Much more emphasis has been given to anatomy, kinesiology, and therapeutic exercise by the use of additional laboratory classes composed of smaller groups for further study and practice. Accumulating modern teaching equipment has likewise been an important part of the planning for improved instruction.

One new clinical affiliation has been added—the Veterans Administration Hospital, Montrose, New York. This affiliation will afford the opportunity for some of the students to receive clinical training and experience with psychiatric patients.

Several students are receiving aid in financing their education—9 from the National Foundation for Infantile Paralysis, 6 from the Veterans Administration (G.I. Bill), 1 from the New York State Department of Health, 1 from the Cerebral Palsy League of Bergen County, 1 from the United States Air Force (WMSC). The need for further and more generous scholarship assistance is still apparent.

Five new instructors have been added to the staff: Professor Edward E. Gordon for radiation, Dr. Milos Lota, for physics, Dr. Phillip S. Vassar, for pathology, Dr. Shih-Chun Wang for physiology, Miss Gertrude Ambrose for bandaging, hydrotherapy, exercise, and physical therapy theory.

To fill the vacancy of Instructor and Field Supervisor for the postgraduate course in cerebral palsy, we were fortunate in securing Miss Helen Spencer, formerly Chief Physical Therapist of the Cerebral Palsy Unit at the Institute for the Crippled and Disabled.

The following new special lecturers were also obtained: Dr. Olav Austlid, Assistant Director, Physical Medicine, Hospital for Special Surgery for kinesiology and underwater exercise and Dr. Elmer Marjay, Chief, Physical Medicine Group, Ray Clinic, Veterans Administration, for physical therapy theory.

Upon the resignation of Miss Floy Pinkerton, Miss Mary Elizabeth Callahan became Assistant Professor and Director of Training for Physical Therapists. We were most fortunate in being able to bring back a graduate of our advanced standing program in physical therapy, Miss Gladys L. Jameson, to fill Miss Callahan's former position of Associate Director. Miss Jameson brings to the program enthusiasm and broad experience.

Professor Callahan is Physical Therapy Advisor (Alternate) to the Nurse and Medical Placement Center of New York and a member of the "Study Group" on the long-term patient, conducted under the auspices of the Commission on Chronic Illness, Baltimore.

Throughout the year, we received requests from professional and voluntary organizations, physical therapists, and universities both in this country and abroad, for information regarding our educational programs, professional trends, and physical setup. Most requests have been taken care of by personal interviews in our office, visits, and observation at the Medical Center and the Institute for the Crippled and Disabled. This year our foreign visitors have come from South America, India, Guatemala, and England.

DEPARTMENT OF PHYSIOLOGY

Professor Magnus I. Gregersen, Executive Officer

Professor Walter S. Root took his sabbatical leave during the fall semester to work in the Donner Laboratory at the University of California, Berkeley.

Professor John L. Nickerson has been on sabbatical leave since October 1, 1953, and is serving as scientific liaison officer for the Office of Naval Research in London. Dr. E. Basil Reeve, member of the Medical Research Unit, Guy's Hospital, London, arrived in January to participate in the teaching of the medical course in physiology as Visiting Professor. Dr. Reeve has decided to remain in the United States and recently accepted a position at the University of Colorado as Associate Professor of Medicine. Dr. Norman Alpert, Instructor in Physiology, has resigned to become Assistant Professor of Physiology at the University of Illinois. Mr. Vincent Glaviano, who is nearing completion of his work for the Ph.D. degree, has been appointed Instructor to fill the vacancy left by Dr. Alpert. So far, suitably qualified candidates have not been found to fill all the assistantships in physiology. One appointee, Mr. Leonard Levine, was drafted in May for military service.

Administrative details of the physiology course for medical students were handled by Professor Thomas H. Allen, and the course for dental students was directed by Professor Nicholas A. DiSalvo, who also presented lectures in oral diagnosis to undergraduate and postgraduate dental students. Professor Louis J. Cizek again served as departmental representative for the Summer Session courses and Professor William L. Nastuk gave the summer course in the School of General Studies. The physiology courses for occupational therapists and physical therapists were taught by Dr. Alpert and Professor Shih-Chun Wang.

Dr. James A. L. Mathers of the Department of Medicine, who has worked with Professor Nickerson for several years, has been directing Professor Nickerson's research on ballistocardiography during his absence. Supported by a grant from the United States Public Health Service, this work has been continued in order to determine the actual displacement pattern developed by the cardiac action and the distortion produced by the human body and by the instruments utilized in recording. Further studies also have been made on the effects of a standard exercise test on the cardiac work of patients and healthy individuals. Mr. Glaviano has completed a study of cardiac output changes in dogs with arteriovenous fistulas. Professor William W. Walcott has extended his metabolic studies with the large Scholander recording respirometer by including a ballistocardiograph of the Nickerson type in the experimental setup. The aim of the work is to compare the cardiovascular and respiratory responses to moderate exercise in various individuals.

Under a grant from the United States Public Health Service, Professor Wang, in collaboration with Dr. Shih-hsun Ngai of the Department of Anesthesiology, has found that cats with complete transsection at the level of the medulla oblongata breathe rhythmically. When given oxygen their blood oxygen saturation, CO_2 tension, and pH remained at normal levels. Professor Wang has also been collaborating with Dr. Herman I. Chinn of the School of Aviation Medicine, Randolph Field, in a study of motion sickness. They

have found that if the nodulus, uvula, or pyramis of the cerebellum of the dog is removed, the operated animal is no longer sensitive to swinging motion. The chemoreceptive emetic trigger zone in the medulla was also shown to be important in mediating motion sickness. The importance of the trigger zone in radiation sickness is now being investigated. Mr. Glaviano and Professor Wang have ascertained that the trigger zone is also the site of the emetic action of morphine and hydergine. Professor Wang and Professor Roberts Rugh of the Department of Radiology have confirmed the report that β-mercaptoethylamine is an effective protective agent for lethal x-irradiation in mice. The mice that survive are found to be fertile in the first four months following irradiation.

Professor Cizek is continuing the investigation of the amount of fluid in the intestinal tracts of various laboratory animals in different stages of food and water deprivation. Professor DiSalvo has continued the study of thirst induced by intravenous hypertonic solutions. In collaboration with Dr. Hans H. Neumann of the School of Dental and Oral Surgery, he has been investigating the uptake of P^{32} in the teeth of normal monkeys and in monkeys which have suffered interference with the chewing function. The effect of vigorous chewing on the caries rate in institutionalized children is also being studied.

In connection with studies on the neuromuscular junction, Professor Nastuk has developed a method for delivering minute quantities of acetyl-choline to a single end plate. In effect, this is equivalent to the establishment of an artificial motor nerve termination since the acetyl-choline is released in a matter of one millisecond. The technique is expected to be very useful in future experiments designed to provide additional critical evidence on the fundamental mechanism by which acetyl-choline depolarizes the end plate membrane. Professor Nastuk has also investigated the action of Tensilon (an anticurare compound provided by Hoffman-LaRoche, Inc.) in neuromuscular transmission.

Professor Allen, Dr. Charles Pallavacini, and Professor Gregersen have measured plasma volume simultaneously with T-1824 and with hemoglobin, utilizing the Soret bands for spectral determination of hemoglobin. The volume distribution of hemoglobin is identical with that of T-1824 in spite of the fact that hemoglobin is lost from the circulation two or three times as fast as the dye. Professor Allen, Dr. Hubert Sear, and Professor Gregersen have also compared the volume distribution of T-1824 with that of human albumin labeled with radioactive iodine, utilizing a scintillation counter built by Dr. Sear. The volumes measured with these two test substances are also identical and the loss rates are similar, confirming the findings of other investigators. The exact differences in estimates of blood volume made with carbon monoxide, ^{32}P, and T-1824 have been investigated by Professors Root, Allen, and Gregersen. Dr. Carol Hsu has studied the uptake of the dye T-1824

by leucocytes. The uptake is extremely slow in plasma where the dye is bound with albumin. This suggests that leucocytes constitute an insignificant factor in removal of dye from the circulating plasma. Mr. Manuel Ochoa and Mr. Robert Roth, medical students working with Professors Allen and Gregersen, have completed a study of the spectral characteristics of T-1824 in the plasma of some twenty species. The striking differences observed are now being investigated by electrophoretic techniques. Drs. George Sisson and Arthur Cain have been investigating the influence of complete section of all buffer nerves on erythropoiesis and red cell volume in dogs. These studies on various aspects of blood volume have been carried out under contract with the School of Aviation Medicine at Randolph Field, Texas.

Dr. Alpert and Professor Root have completed an investigation, also under the contract with the School of Aviation Medicine, of the utilization in the dog of various forms of lactate. The results demonstrate that L(—) lactate, the naturally occurring isomer, is utilized many times more rapidly than D(+) lactate.

Professor Gregersen has completed a study of the effect of x-irradiation on the red cell volume and plasma volume of monkeys. It would appear from the results that death from x-irradiation cannot be ascribed to a reduction in circulating blood volume. Dr. Pallavacini and Professor Gregersen have continued their studies on the effect of x-irradiation on the chemical composition of brain tissue. These studies on radiation sickness are being supported by a grant from the United States Public Health Service.

DEPARTMENT OF PSYCHIATRY

Professor Nolan D. C. Lewis, Executive Officer

The medical student instruction procedures have received particular attention in the light of several new developments in the fields of psychosomatic medicine. The first-year program was modified to include early contact with the emotional problems of patients.

Over sixty research problems were under way, including several that were supported by grants from foundations. Some of the long-term projects involve the fields of medical genetics, neurochemistry, sex offenders, experimental psychoses, and psychosurgery.

Professor Franz J. Kallmann was honored with the Salmon Memorial Lectureship. The three lectures were delivered at the New York Academy of Medicine in November, 1952, under the title "Inheritance in Mental Disorders." They will be published in book form and will include numerous examples of mental disorders in twins.

A total of sixty-five scientific articles, monographs, and books have been published by members of the academic staff. These include both clinical and

basic science researches on problems bearing on the structure, function, and pathological aspects of those affected with mental disorders.

Professor Robert B. McGraw has been chairman of the Ad Hoc Committee on Problems of Out-Patient Clinics of the American Psychiatric Association. This Committee has been continued. The particular project, suggested by the remarks of Dr. Kenneth Appel, the President, is a follow-up study of patients discharged from hospitals.

At the Psychoanalytic Clinic for Training and Research matters progressed smoothly during the past year, with relatively few changes in the teaching staff or curriculum. Seven more graduates of the Clinic were appointed to the staff. One of these was obliged to enter military service shortly after his being appointed. From the total enrollment of about 60 students, 9 are currently on leave for military duty. Some of these men were in the last quarter of their analytic training, with the result that their withdrawal from the Clinic caused considerable hardship to the several patients under their care. This development precipitated a change in policy regarding admission to training. Now, any student accepted is advised to complete his military service prior to enrollment, should there be any question of his eligibility for service. As a result of this decision only 12 students have been admitted to the first-year class for September, 1953.

A new research project on schizophrenia was started last fall under the direction of Professor Sandor Rado with the assistance of Drs. Saul Karlen, Charles Hogan, Bruce Buchenholz, and Angel Miranda-Rivera.

Although the research is visualized as a long-term undertaking, covering many years, a preliminary report on the pilot study will be published within the next two years if the results continue to be as significant as they currently appear.

Special clinical conferences for students who go beyond the third year have been organized under the direction of Professor Abram Kardiner. They will be held on Saturday mornings, and will include sixty-four hours per year. The patients will be presented in person before the student body as they are in the other clinical conferences at the Clinic.

Seventeen students started training in the fall of 1952. About half of them had already completed two years of psychiatric residency prior to enrollment; 25 per cent had had one year of residency; and 25 per cent started their psychiatric residency and training at the Clinic simultaneously. As in the past three years, most of the students were under thirty years of age.

Dr. Lothar Gidro-Frank was appointed supervisor of students working in the admissions office, thus insuring that every third-year physician who is engaged in this diagnostic work receives full supervision throughout his five-month period in this aspect of clinical experience.

Professor Arnold Friedman of the Department of Neurology has joined the Clinic staff to reorganize the course in neurology under the direction of Pro-

fessor H. Houston Merritt. During the Spring Session, he gave a preliminary series of neurological case demonstrations to second-year students. The demonstrations were highly successful and will be incorporated as a twenty-four hour adjunct to the thirty-two hour lecture program in neurology starting in September, 1953.

This past year a teaching program for students at Manhattan State Hospital, planned along similar lines to the one instituted at the New York State Psychiatric Institute two years ago, was put into effect. Drs. Bruce Buchenholz and Janet Kennedy gave supervisory sessions to the students at Manhattan State every week. It is hoped that there will be a further expansion of this program next year.

Professor Rado delivered the academic address on the subject "Recent Advances of Psychoanalytic Therapy" at the annual American Psychiatric Association meeting in Los Angeles.

Dr. Nathan W. Ackerman read before professional organizations several papers, including "Interpersonal Disturbances in the Family" for the American Psychiatric Association and "Selected Problems in Supervised Analysis" before the Schilder Society. His chapter "Psychiatric Disorders in Children: Diagnosis and Etiology" appeared in *Current Problems in Psychiatric Diagnosis,* edited by Hoch and Zubin and published by Grune and Stratton. He has two books in preparation and gave many talks before professional and lay groups.

Dr. Henriette R. Klein served as a representative of the Clinic to the American Psychoanalytic Association and otherwise was active in professional and community organizations.

Dr. James P. Cattell wrote "The Dynamics of Post-Topectomy Psychotherapy in Patients with Pseudoneurotic Schizophrenia" which was published in the *American Journal of Psychiatry.*

Dr. Leon Moses completed his five-year study of hypertension and continued his work with duodenal ulcer and early coronary disease. He gave professional papers before the Association for Psychoanalytic Medicine and the New York Academy of Science.

Dr. Bernard C. Glueck, Jr., gave two courses in psychiatry at the School of Public Health and continued to be active in community mental hygiene associations in addition to carrying on his research work with the New York State Department of Mental Hygiene.

The medical-psychiatric division is awaiting with interest the crystallization of plans to have a full-fledged psychiatric unit in the Presbyterian Hospital, including the assignment of a specific number of beds. This is a development long envisaged and should prove an important step in the greater contribution of the Department of Psychiatry to the Medical Center. So far, implementation of the plan has led to the appointments of Professors George E. Daniels and John A. P. Millet and Dr. Kenneth Kelley.

One of the features of the year has been the four-month service of Dr. Edward Leonard as resident psychiatrist for the medical-psychiatric division. Dr. Leonard, who had had one year of training in the psychiatric division at the New York University-Bellevue Medical Center as a part of his medical resident training, utilized the period available for research or work in a specialty field to round out his experience. This has worked out very satisfactorily for both the staff and Dr. Leonard, and gives a prototype for what should be a regular adjunct of the medical-psychiatric division. Dr. Leonard, in addition to doing routine psychiatric consultations, followed a number of cases on the wards and carried seven patients in the outpatient department under Professor Millet's supervision. Dr. Leonard made liaison with the house staff possible through numerous informal consultations and conferences, which would have been impossible for a part-time staff member. This added liaison improved notably the ward teaching of second-year students at the Psychoanalytic Clinic for Training and Research. It is hoped that the department will be able to obtain a second-year Psychoanalytic Clinic student to succeed Dr. Leonard. This would follow the tradition set by Dr. John Poe in 1947 and Dr. Ruth Easser in 1948, both of whom served in such a capacity.

Dr. Blaise A. Pasquarelli joined the service in September, 1952, and then left in March, 1953, in order to assume his new position of Associate Clinical Psychiatrist in charge of the male service at the New York State Psychiatric Institute. Dr. Paul Ecker was called back into service and is now stationed at the United States Naval Air Development Center in Johnsville, Pennsylvania. Dr. Jacob Arlow left the Psychoanalytic Clinic, where he supervised students, to join the State University of New York College of Medicine with an appointment as Clinical Assistant Professor of Psychoanalytic Medicine. Dr. Margaret O. Strahl has taken a five-year leave of absence. The Department has been fortunate in obtaining the services of Drs. John Cederquist and Joseph Lubart to assist with consultations and teaching.

Dr. Felix Hoffman has been appointed to the position of Associate Psychoanalyst at the Psychoanalytic Clinic, where he was assigned to the Kingsbridge Veterans Hospital. As Attending Psychoanalyst at the Kingsbridge Veterans Hospital, Dr. Hoffman is in charge of the psychosomatic service. There his duties include lecturing, conducting seminars, and supervising the psychiatric residents. Plans are under discussion with Dr. Milton Sapirstein of the Kingsbridge Veterans Hospital to have members of the psychiatric resident staff there take part of their training in the regular Vanderbilt Clinic under the supervision of our division.

A project on the psychological aspects of amenorrhea, undertaken by Professor Daniels, Drs. Kelley, Ruth Easser, Russell Monroe, and the late John Poe has been completed and is in press. It is due to appear in *Psychosomatic Medicine* under the title "Psychological Correlations in Secondary Amenorrhea."

The study of ulcerative colitis by Drs. Aaron Karush and Robert B. Hiatt of the Department of Surgery has also been completed. "The Psychoanalysis of Two Cases of Ulcerative Colitis" by Dr. Karush and Professor Daniels has appeared in the March-April issue of *Psychosomatic Medicine*. Some other papers growing out of this study are in preparation. One will be on psychophysiological correlations, another on drug studies, and a third will be a report on all cases of ulcerative colitis seen at the Medical Center.

Dr. Ruth Moulton, with the cooperation of Dr. Sol Ewen and Professor William A. Themann of the Department of Dental and Oral Surgery, studied periodontal conditions. This has been reported in *Oral Surgery, Oral Medicine, and Oral Pathology,* under the title "Emotional Factors in Periodontal Disease." This article was abstracted and presented in this form in the *Digest of Dental Diseases*. Dr. Moulton, together with Dr. Max Cohen of the Psychoanalytic Clinic for Training and Research and in cooperation with Dr. L. Laszalo Schwartz of the Department of Dental and Oral Surgery, has been engaged in studying temporomandibular joint disease. So far the study has shown that a tremendous number of patients who complain of pain in the temporomandibular joint are really suffering from muscular tension rather than any joint disease. Most of the patients seem to have bruxism.

The long-recognized connection between disturbed emotional states and Raynaud's disease led Professor Millet and his associates from the Psychoanalytic Clinic, along with Dr. Hiatt and Drs. Frederick K. Heath and Isadore Mufson of the Department of Medicine, to consider a more thoroughgoing investigation into the relationship between disturbed emotions and the pathological changes in the peripheral vascular tree. Because of limited funds the dimensions for the project have not been formed yet. A dynamically oriented, intensive psychological and psychotherapeutic study of selected cases has been started and protocols are now being assembled for study. A preliminary report on four of these cases has been published in *Psychosomatic Medicine* in January. We hope to receive funds for this project so that we will be able to do a thorough investigation of this problem.

Dr. Moses has completed an initial five-year study of a case of essential hypertension using a combined psychoanalytic and ballistocardiographic technique, and is continuing a second five-year study of a normal personality with sustained essential hypertension using the same combined technique. Dr. Moses presented this hypertension study to the Association for Psychoanalytic Medicine in November, 1952, and to the American Psychosomatic Society in April, 1953.

Dr. Felix Hoffman is continuing his research in functional excessive bleeding in women with no organic pathology. A preliminary report on a study in preparation for natural childbirth has been submitted by Dr. Easser and Miss Hogan.

The course in psychiatric conferences given to third-year clinical clerks

who are on the medical services has reached this past year what we consider to be optimum teaching conditions. In order to increase individual teaching the group was divided into five sections of five or six students per instructor. The classes met once each week for one and a half hours. With these smaller classes each student has an opportunity to work up and present a patient for discussion; it is felt that in this way it is possible for the student to gain much more. Several members of our staff rotated on this teaching program.

The course in psychosomatic medicine, headed by Dr. Kelley and given to third-year medical students while on their specialties, has also been changed in several ways. As mentioned in our last report, the first hour of each three-hour session is devoted to didactic lectures covering various psychogenic illnesses. For the next two hours the students go to one of three wards to interview patients. During this two-hour period the students rotate on alternate mornings through the surgical wards where they are supervised by members of the staff.

Dr. Moulton, with the assistance of Dr. Sidney L. Horowitz of the Department of Dental and Oral Surgery, taught a course in psychosomatic dentistry again. This series of eight lectures of one and a half hours was given to both undergraduates and graduates of the Dental School.

Dr. Walter Stewart again taught two courses in psychosomatic medicine to physical and occupational therapy students.

Dr. Kelley was asked to serve on the Ethics Committee for the New York Psychoanalytic Society. Professor Millet has been elected Chairman of the United States Committee on World Federation for Mental Health. He has continued as a member of the Consultative Committee to the United Nations on Mental Health and of the Psychiatric Advisory Board of the New York State Division of the Vocational Rehabilitation Board. "A Psychoanalyst's Viewpoint on Sexual Problems" was published in February, 1953. Among the lectures given by Professor Millet were "Acquiring Emotional Adjustment to Disability" at the Institute of Physical Medicine and Rehabilitation in July, 1952, and "Motivations, Positive and Negative, in the Rehabilitation of the Disabled" which was read at the second annual conference of the American Rehabilitation Association in Atlantic City in May, 1953.

Dr. Viola Bernard published "Psychoanalysis and Members of Minority Groups" in the *Journal of the American Psychoanalytic Association* in April, 1953. She also wrote a chapter in *Psychoanalysis and Social Work*. Between September and January, at the New York School of Social Work Dr. Bernard taught a seminar on psychiatric problems of adults. Dr. Bernard continues as a member of the Executive and Advisory Committees of the Survey of the Bureau of Child Guidance of the Board of Education in the City of New York.

Dr. Pasquarelli collaborated with Dr. Leopold Bellak on the book *Manic Depressive Psychosis and Allied Conditions*. Dr. Moses participated in a

symposium on hypertension sponsored by the American Psychoanalytic Association in December, 1952. He was also the psychiatric discussant of the panel of etiology of colonic disorders at the New York Academy of Science conferences in April, 1953.

Dr. Easser discussed "Some Aspects of Menstrual Disturbances" at the Association for Psychoanalytic Medicine in February, 1953. This paper will be published in *Psychosomatic Medicine*.

Dr. Hilde Bruch gave a lecture entitled "Changes in Infant Care—Psychological Aspects" at a conference of the pediatric staff of the New York Hospital in November, 1952. In addition to having several papers published last year, Dr. Bruch wrote a book entitled *Don't Be Afraid of Your Child* which was published by Farrar, Strauss, and Young.

During the academic year beginning July 1, 1952, the teaching activities in child psychiatry continued as previously. The clerkship in clinical psychiatry, which was begun in the preceding academic year, proceeded with some minor modifications which made it a more useful experience for the students. In addition, since the current third-year class had had ten hours on personality growth and development in children and the various factors affecting it from Professor William S. Langford during their second year, the class came to its clerkship during the third year with a different perspective on the emotional aspects of childhood than the preceding class. The plan of giving this course during the second year is an excellent one as it also has some effect on orientation for the third-year pediatric clerkship in dealing with sick and well children.

During the past year the pediatric teaching duties have included one afternoon a week of clinical teaching in the outpatient clerkship as well as occasional case presentations in the mornings throughout the academic year. In addition, an innovation was begun in the material presented during the obstetrical clerkship where the students are given eight or nine sessions which have to do with problems of the newborn. The two-month clerkship involves nine Wednesdays, one of which is devoted to discussion of the mental health aspects of the lying-in and newborn periods.

Our work with the pediatric resident staff continues with most of the residents rotating through the pediatric psychiatric clinic for a two- to four-month period, during which the Department attempts to acquaint them with the contributions of psychiatry to pediatric practice and to assist them to be able to develop a mode of practicing which is truly comprehensive.

In October, 1952, Professor Langford presented a preliminary report on the study of accident repeater and non-accident children at the combined meeting of the American Academy of Pediatrics and the National Safety Council. This work was carried out under a grant from the Metropolitan Life Insurance Company. This preliminary report has received a good deal of comment and has been published in *Pediatrics*. The analysis of the material,

which includes general physical, neurological, psychological, and psychiatric studies on a small group of accident repeater and non-accident children, was continued during the year. Another report on this same material was presented in November, 1952, at the Buffalo Academy of Medicine. In March, 1952, this material was presented at the meeting of the Greater New York Safety Council.

During the year, Professor Langford served as the vice-chairman of the New York County Medical Society Special Committee on Child Welfare and was re-elected Treasurer of the American Orthopsychiatric Association at its annual meeting in February, 1953.

SCHOOL OF PUBLIC HEALTH

Professor Harold W. Brown, Associate Dean and Director

The faculty of the School of Public Health has continued to revise the curriculum of the School in order to bring it in line with current practices and developments in public health and administrative medicine.

The faculty of the School of Public Health continued to sponsor a series of forums, which are open to all students of the School of Public Health and to the Medical Center community. Among the authorities who participated in these forums during the year were Dr. Harry S. Mustard, Executive Director, State Charities Aid Association; Dr. Edwin L. Crosby, Director, Joint Commission on Accreditation of Hospitals; Dr. Mayhew Derryberry, Chief, Division of Public Health Education; Dr. Herman E. Hilleboe, Commissioner, New York State Department of Health; and Dr. A. Bradford Hill, Professor of Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.

INSTITUTE OF ADMINISTRATIVE MEDICINE

The general plan of teaching in the Institute of Administrative Medicine is gradually evolving, and four students were accepted for advanced study. Three of these were physicians and one a layman who was interested in administration in the prepayment movement. A program of study and research is arranged to suit the individual student's background and interests. During the first semester the student attends whatever academic courses are considered essential for him and engages in as much special study as time permits. At the end of the first semester, the student embarks on one year of field work in the types of institutions in which he is most interested. Some students spend three months in each of four different but related types of institutions. A difficulty in the development of such residency programs in administrative medicine has been the lack of appreciation of the importance of a preceptor program on the part of prepayment and industrial medicine groups.

The students in administrative medicine work very closely with the pro-

gram in hospital administration. The latter curriculum is now completing its eighth year, and has 177 graduates, a number of whom occupies prominent positions in the field.

A major change made this past year in the method of teaching hospital administration was the placement of the administrative residency in the middle of the course. The students spend the Winter Semester in academic residence which is followed by a year of practical experience in an approved hospital, after which they return to the School for the Spring Semester. It is expected that the new program will permit the development of a much sounder curriculum. In the past the students completed a year of academic study on the campus before the year of residency. This made it difficult to integrate the two phases of their program.

Guest speakers during the year in the Institute of Administrative Medicine were Dr. Edwin L. Crosby, Director of the Joint Commission on Accreditation of Hospitals, and Dr. Anthony J. J. Rourke, Director of the Hospital Council of Greater New York.

Dr. John Gorrell, Associate Professor of Hospital Administration since the inception of the course eight years ago, is leaving Columbia at the end of this school year in order to enter the field of hospital consultation. During the year, Professor Gorrell served as a member of the Commission on University Education in Hospital Administration; the American College of Hospital Adminstrators committee on the revision of the residency manual; Council on Hospital Planning of the American Hospital Association.

Mr. Michael Mertel, who had been Research Associate in Hospital Administration for several years, resigned early in the year to take the post of Administrator of the Riverside Hospital, Boonton, New Jersey. Mr. John P. Delaney, Research Assistant in Administrative Medicine, who has been resident in charge of the School's San Francisco Health and Hospital Survey this year, will replace Mr. Mertel.

Mr. Roy H. Dickerson was appointed Research Assistant in Administrative Medicine.

The Institute of Administrative Medicine is interested in developing research projects which will give needed information on various phases of administrative medicine. The Institute is cooperating with Professor William C. Spring, Jr., in his research program on the existing and potential relationship between curative and preventive medicine. This program is under the auspices of the American Public Health Association.

The Institute, under the direction of Professor E. Dwight Barnett, began a study of the health and hospital facilities of the City of San Francisco. This study is being sponsored by a citizens' committee and financed by the San Francisco and Rosenberg Foundations. The study is unique in that it will attempt to ascertain not only how the hospital and clinical services of the city are conducted and what quality of service is available, but also how each

patient has financed the payment for his care, with particular attention to the effectiveness of prepayment programs of various types.

During the summer of 1953 a research program under the direction of Professors Leonard J. Goldwater and Barnett will be initiated with the following objectives: to develop criteria for the evaluation of general preventive health services in industry; to determine the fields of applicability of such criteria; to determine, through use of these criteria, the value of preventive health programs to the employee and the employer and to general public health, particularly in relation to nonoccupational illness; and to develop criteria for the evaluation of the effectiveness of the different types of prepayment plans found in industry.

During the year, the Institute of Administrative Medicine cooperated with the Bureau of the Census in Washington, D. C., in their census of institutions caring for the chronically ill. Data are not available on the institutions that are caring for long-term bed patients and the types and quality of such care.

Professor Barnett continued to serve as a member of the Blue Cross Commission. During this past year he also served on the following committees: Board of Trustees of the American Hospital Association; Board of Trustees of National League for Nursing; delegate of the American Hospital Association to the National Health Council; Committee on Extension of Hospitals and Other Facilities of the American Medical Association; Board of Directors, Health Insurance Plan of Greater New York; Research Advisory Committee of Research Council for Economic Security; and Joint Commission on Accreditation of Hospitals.

Professor Barnett spoke at the annual meeting of the Blue Cross and Blue Shield Plans in Kansas City and also at the annual meeting of the Board of Trustees of Barnert Hospital in Paterson, New Jersey. He presented a paper at the American Association of Record Librarians in Washington and two papers at the Middle Atlantic Hospital Assembly.

DIVISION OF BIOSTATISTICS

The teaching activities of the Division were similar to those of previous years. The first course, introduction to vital statistics, was given to 100 students of the School of Public Health. The course in the elements of statistical analysis was attended by 65 students, 5 of whom were working for the Ph.D. degree in the Graduate School.

Three students were registered for the degree of Master of Science in biostatistics. There were also 4 part-time special students in biostatistics. Two students have been working toward the degree of D.P.H. with a major in biostatistics. One of the students is working on the assessment of cause of death and preventability of prenatal mortality. The other is working on the influence of air pollution on morbidity and mortality from respiratory cancer.

Professor John W. Fertig and Mrs. Phyllis B. Michelsen gave a series of

lectures on research methods in the Department of Physiology of New York University. Professor Fertig planned a course in medical statistics for medical students at the State University of New York, College of Medicine; the course was given by various present and former students of the Division of Biostatistics.

Professor Fertig has continued working with Professor Neal W. Chilton of the Department of Dental and Oral Surgery on the adaptation of certain statistical techniques to dental research problems. This work has been partly sponsored by the United States Navy.

Professor Fertig was Chairman of a Committee on Training of Medical and Public Health Statisticians of the Statistics Section of the American Public Health Association. The results of a survey of current teaching and training were reported at the annual convention of the American Public Health Association and were published in the yearbook of the Association. He is continuing his participation with Professor Morton M. Kligerman of the Department of Radiology in the experiment on radiation sickness.

Professor Fertig has been working closely with Dr. Leon Buchbinder of the New York City Department of Health in the assessment of various methods of determining the coliform content of ice cream and with Dr. James A. L. Mathers of the Department of Medicine in the assessment of the reliability of the ballistocardiograph.

Professor Fertig has continued his close cooperation with the Family Health Maintenance Demonstration at Montefiore Hospital, and also continues as a statistical consultant for the Sidney Hillman Health Center. Together with Professor Chilton, Professor Fertig has collaborated closely with Dr. Bissell B. Palmer of Group Dental Health Insurance in his attempts to measure the dental needs of an adult working population.

The Division has continued to give frequent consultation to research workers of the Medical Center and of the New York City and State health departments.

On April 1 Professor Fertig began a five-month leave of absence to undertake teaching and consulting duties for the Pan American Sanitary Bureau of the World Health Organization in the Medical School and the Inter-American Center of Biostatistics in Santiago, Chile, and in the Medical School in Montevideo, Uruguay.

DIVISION OF EPIDEMIOLOGY

Dr. Robert L. Vought was advanced to the rank of Assistant Professor and has joined the faculty on a full-time basis.

The research project in the epidemiology of hypertension, under the direction of Professor E. Gurney Clark, in cooperation with the Bureau of Applied Social Research of Columbia University and the Reccess Commission on Hypertension of the Commonwealth of Massachusetts, was continued for

another two years by virtue of a grant from the Commonwealth of Massachusetts. The literature on hypertension is being critically evaluated in the fields of hyperreactivity, measurement of blood pressure, heredity, psychology, sociology, medicine, and physiology. An experiment on comparative pressor responses to various stimuli (pressor tests) was undertaken.

Professor Clark continued his participation in research planning for the Endemic Syphilis and Favus Control Program in Yugoslavia and in Yaws Control in the Far East and continued his active participation in the studies of untreated syphilis in Norway.

The following papers were presented by members of the staff of epidemiology: "The Decline and Fall of Syphilis in New York State," L. deMello and R. L. Vought, the 15th Annual Session of the American Venereal Disease Association; "Comments on Epidemiology and Control of Endemic Syphilis in Bosnia," E. Gurney Clark, read in author's absence at Expert Committee on Venereal Disease and Treponematosis, World Health Organization; "Natural History of Essential Hypertension," E. Gurney Clark, at Medical Society of Drammen, Norway.

Professor Clark has continued to serve as a member of the Subcommittee on Venereal Diseases, National Research Council. He has continued his work as special consultant to the Venereal Disease Division of the United States Public Health Service and is a member of the Expert Panel for Venereal Disease and Treponematosis of the World Health Organization.

Professor Clark will spend a sabbatical leave as Visiting Professor at the University of Oslo, Department of Dermatology and Syphilology, under a Fulbright Award, and will conduct seminars in a faculty group at the University of Oslo School of Medicine.

Professor Clark was appointed as Medical Consultant to the American Social Hygiene Association.

Visiting lecturers in epidemiology included Mr. Michael Bade, Chief, Division of Hospital and Institutional Inspection, New York City Department of Health; Dr. Jacques M. May, Medical Division, American Geographic Society; Dr. Howard A. Schneider, Rockefeller Institute for Medical Research.

DIVISION OF OCCUPATIONAL MEDICINE

Studies are being continued under the direction of Professor Leonard J. Goldwater on consumer reaction to prepayment medical care programs. Financial support for these studies is being received from the Consumers' Technical Institute, New York. With the support of the New York Heart Association, he is also developing his study of heart disease and workmen's compensation.

Professor Maurice E. Shils, in collaboration with Mrs. Anna C. Gelman, is continuing his studies in the micro technique for measuring vitamins in agar tubes which was developed in this laboratory. The applicability of the method to the detection of thiamine in urine is being studied—a project being spon-

sored by grants from Merck and Company and the Nutrition Clinics Fund.

Professor Shils and Dr. Wellington B. Stewart of the Department of Pathology are continuing their study of the effects of diets which contain large amounts of corn and small amounts of animal protein in an attempt to induce in rats the analogue of human Kwashiorkor. Thus far, the abnormal changes induced in the experimental animals include the graying of the normally black fur, alopecia, fatty liver, reduced growth, failure to produce viable young, and absorption of abnormal amounts of iron. The nutrition factors in preventing or curing these abnormalities are being investigated. This project is supported by the National Vitamin Foundation.

A collaborative study is proceeding with Drs. Daniel Shapiro and LaRoy S. Dietrich of the Department of Surgery on the concentrations of various vitamins in normal and tumor tissues of the mouse. It is hoped that the information obtained will afford more insight into the mode of action and practical value of hormones and antimetabolites in cancer chemotherapy. The project, which is being carried out under the direction of Dr. Shils, is supported by a grant from the Public Health Service.

Professor Goldwater is serving as Chairman of Cardiac-in-Industry Committee, American Heart Association. He was recently appointed a member of the Correspondence Committee on Occupational Safety and Health of the International Labor Office. Professor Goldwater went on a mission to Yugoslavia and Finland from June through September, 1952, under the auspices of the World Health Organization. His duties on this mission consisted of studying various occupational health problems and advising the respective governments and responsible persons on methods of meeting these problems.

Professor Shils is serving as Chairman, Food and Nutrition Section, Welfare and Health Council, New York City, and as member of the Standing Committee on the School Lunch Program, established by the Superintendent of Schools of New York City. Professor Shils was Chairman of a round-table session and a member of a panel at the National Nutrition Institute, Washington, D. C., December, 1952.

DIVISION OF PARASITOLOGY

During the past academic year, twelve graduate students majored in the field of parasitology; five of them completed the work for the Master of Science degree. Special arrangements were made for two fourth-year medical students to spend their elective period at the hospital of the Alcoa Mining Company in Moengo, Dutch Guiana. These students served as interns in the hospital and participated in a parasite survey in the area about Moengo. During the past year the staff in parasitology was frequently consulted by third- and fourth-year medical students in connection with patients harboring parasitic infections. Such instruction is unusually stimulating not only to the students but to the faculty as well.

As in past years, a number of missionaries have spent varying lengths of

time in the Division of Parasitology reviewing various aspects of parasitic diseases.

The use of the Tropical Disease Diagnostic Service of the New York City Department of Health has continued to expand. This service affords excellent clinical and laboratory experience in tropical disease. Professor Howard B. Shookhoff is in charge of these activities.

Professors Harold W. Brown and Kathleen L. Hussey and Dr. Kam-Fai Chan have continued their studies on the chemotherapy of enterobiasis. They have found that the two mouse pinworms respond to the standard anthelmintics very much as does Enterobius of man. It is apparent, therefore, that compounds found effective against the mouse parasite will probably be active against the human parasite. A large number of new compounds, furnished by various pharmaceutical firms, are being tested against the mouse pinworms. The pinworm is one of the most common parasites of man, and at present no effective, nontoxic, inexpensive anthelmintic is available. Dr. Chan has found that there is a synergistic action between certain compounds acting upon the pinworm of mice. This discovery may have useful application.

Professors Brown and Hussey have continued to test new drugs against infections of Endamoeba histolytica. These researches are directed toward the finding of a more effective chemotherapeutic agent against intestinal amebiasis.

Professor Brown has continued to follow a number of filariasis patients whom he treated ten years ago on the Island of St. Croix. One of the theories of the production of elephantiasis in filarial-infected individuals is that the death of the adult worms stimulates a lymphangitis which results in the elephantiasis. Professor Brown is, therefore, following these filarial patients over a long period of time to ascertain whether or not any of the treated persons whose adult worms were presumably killed will develop elephantiasis. To date, none of the patients has developed this serious complication of filariasis.

Professor Roger W. Williams served as consultant to the Communicable Disease Center, Public Health Service, Atlanta, Georgia, and Emory University Field Station, Newton, Georgia. For these agencies he initiated studies on the haemophagous flies of the genus Culicoides in southwest Georgia to obtain information on the bionomics of the respective species found in this area and to establish laboratory colonies so that disease-transmission studies might be conducted. The immature stages of these flies might be associated for the first time with their respective adults.

During the summer of 1952 Professor Hussey worked at the University of Michigan Biological Station where she and Dr. L. J. Thomas of the University of Illinois are studying the life cycle of tapeworms of birds which are related to human cestodes.

Professor Brown served temporarily as Acting Dean of the School of Medi-

cine of the University of Puerto Rico during the short period when that institution was seeking a new dean. Columbia University has cooperated in the development of this new medical school, the first class of which will be graduated in June, 1954. At the invitation of the Mutual Security Agency of the United States Government, Professor Brown also spent some time in Formosa studying its university medical school and making recommendations for its improvement.

DIVISION OF PUBLIC HEALTH EDUCATION

Miss Ada M. Paul was appointed Instructor in Public Health Education on July 1, 1952.

In field work, the students in health education are now required to work with some health agency in the City of New York or its suburbs during the academic year in order to require practical knowledge and experience in carrying out health education programs. Among the agencies utilized during the academic year 1952–1953 were: Queensboro Tuberculosis and Health Association, New York City Department of Health, Madison House, Health Insurance Plan of Greater New York, Yonkers Health Department, Hamilton House. As a result of the association developed in the course of programming these activities, members of such agencies have been brought into the teaching program of the School in their respective areas of health education.

Among those who participated in the teaching program during the year were the following: Dr. Granville W. Larimore, Director, Health Education, New York State Department of Health; Mrs. Sallie E. Bright, Executive Director, National Publicity Council; Mr. Ralph T. Fisher, State Consultant, Community Health Organization, New Jersey State Department of Health; Mr. Sol S. Lifson, Director, Division of Health Education, National Tuberculosis and Health Association; Dr. Henry C. Sandler, Chief of Dental Services, Veterans Administration Hospital, Brooklyn; Mr. Irving S. Shapiro, Director, Division of Health Education, Health Insurance Plan of New York; Dr. George M. Wheatley, Vice-President, Welfare and Health Division, Metropolitan Life Insurance Company, New York City; Dr. Bruno F. Gebhard, Director, Cleveland Health Museum; Dr. Iago Galdston, Executive Director, New York Academy of Medicine; Miss Dorothy F. Schober, American Heart Association; Dr. Mayhew Derryberry, Director, Division of Health Education, U. S. Public Health Service; Mr. John B. Dibeler, Director, Bureau of Health Education, American Cancer Society, Philadelphia Division; Dr. Morey R. Fields, Director, Division of Health Education, New York City Department of Health.

Professor George Rosen was invited by the first-year class of the College of Physicians and Surgeons to give an orientation course in the History of Medicine, which was presented during the spring. He also presented papers at numerous conferences.

DIVISION OF PUBLIC HEALTH PRACTICE

The content and format of the teaching program in the Division of Public Health Practice have been under constant revision throughout the year. A major reorganization was planned and, as the academic year progressed, many of the changes were implemented. Present and anticipated conditions in the field of public health make it advisable to extend the subject matter beyond the conditions existing in the United States. Some attempt has been made during the current year to consider conditions in less well-developed areas here and abroad. The method, basically one which considers relative public health progress in place and time, was well received and will be extended next year.

Among the notable guests who lectured to students under the auspices of the Division of Public Health Practice during the year were Dr. John W. Knutson, Assistant Surgeon General, United States Public Health Service; Dr. Reginald S. Atwater, Executive Secretary, American Public Health Association; and Dr. Roscoe P. Kandle, Associate Director, Community Research Associates.

Dr. Bernard C. Glueck gave a course in human behavior, which was followed by a second course which considered the application of psychiatric principles in the daily experiences of the public health workers.

Professor William C. Spring, Jr., has accepted the chairmanship of a committee under the auspices of the American Public Health Association which, through the Institute of Administrative Medicine, will study the existing and potential relationships between curative and preventive medicine. It is expected that the study will catalogue fruitful areas for coordination of preventive and curative medical services.

Professor Spring has accepted the staff responsibility for the preparation of a Guide to Local Health Administrative Practice, also for the American Public Health Association. This guide is intended as a companion volume to the Manual of Communicable Diseases to assist planners and administrators of local health services in the efficient utilization of available funds and personnel.

Professor Spring has also served during the year as a member of the advisory committee for the Public Health Service study of Public Health Nursing Needs in Defense Areas. This study is designed to establish a means of appraising the public health nursing needs of any community by assessing the local public health problems and the other available resources.

A working committee of the National League for Nursing, on which Professor Spring served during the year, completed its study of service analysis and costs and published its report, "Statistical Reporting and Costs in Public Health Nursing."

Professor Spring has continued to serve as Secretary of the Preventive Medi-

cine and Public Health Section of the Medical Society of the State of New York. He has also participated actively in the Welfare and Health Council of the City of New York as one of the delegates from the College of Physicians and Surgeons, as a member of the Planning Board of the Health Division, and as Vice-Chairman of the Subcommittee to Implement the American Public Health Association Report for the Mayor's Committee on Management Survey.

Professor Spring participated in the New York State Health Department's training programs for medical students and public health residents.

Professor Spring participated in the Conference on Public Health Nursing Care of the Sick at Home held at the Arden House campus of Columbia University under the sponsorship of the Department of Public Health Nursing of the National League for Nursing.

Professor Spring also served as the Consultant in Public Health for a study of health and hospital facilities for the City of Syracuse, New York.

Professor Margaret W. Barnard, as one of the planning consultants under Clarence Stein as master planner, completed the basic design for the health and medical care program for the Kitimat project of the Aluminum Company of Canada in British Columbia. This material, which was used in the problems course in public health practice, provided a practical, currently alive illustration of planning for the total field of public health, hospital, and home care for a new community.

Professor Barnard has accepted the chairmanship of a new subcommittee on Community Mental Health initiated by the Riverside-Washington Heights District Health Committee.

Professor Barnard continued her membership on the Public Health Committee of the New York County Medical Society. Again, this was a means for bringing to the students current problems in public health practice. Professor Barnard has also accepted the chairmanship of the Health Officer Section Committee on Professional Education of the American Public Health Association.

DIVISION OF SANITARY SCIENCE

Professor Alvin R. Jacobson assumed the direction of sanitary science teaching upon the resignation of Professor John M. Henderson on July 1, 1952.

Five students specialized in the curriculum leading to the degree of Master of Science in sanitary science. There was a noticeable increase in the number of students taking elective courses in sanitary science, especially among the foreign students. This is a reflection of the recognition of the importance of basic sanitation in the present and future development of public health in the homelands of the foreign students.

Five sanitary science students completed the six-week program of supervised summer field training instituted in June, 1952, as a requirement for the Master of Science degree. This program was developed in cooperation

with the Training Division of the Communicable Disease Center of the United States Public Health Service, through the training center at Amherst, Massachusetts, and is an integral part of the sanitary science curriculum.

A similar supervised field-training program, but of only two weeks' duration, was instituted on a trial basis in May, 1953, to provide the candidates, especially those students from other parts of the world, for other degrees in public health with an opportunity to observe and study the operation of municipal and rural facilities in environmental sanitation.

Among the persons who participated in the teaching program during the year as guest lecturers were the following: Mr. Richard Hazen of Hazen and Sawyer, Consulting Engineers; Mr. Sol Pincus, Consulting Sanitary Engineer; Mr. J. Lloyd Barron, Director of Sanitation Department, National Biscuit Company; Mr. L. L. Hedgepeth, Technical Consultant, American Cyanamid Company-Calco Chemical Division; Mr. Robert L. Murrill, United States Public Health Service; Mr. John W. Dermody, Consulting Sanitary Engineer; Mr. Sheldon Lang, Consulting Sanitary Engineer; Mr. Emil A. Tiboni, Sr. Training Officer, United States Public Health Service; Mr. J. H. Le Van, Sr. Sanitary Engineer, United States Public Health Service; Mr. Guy E. Griffin, Sanitary Engineer, American Cyanamid Company-Calco Chemical Division; Mr. Harry A. Faber, Associate Editor, *Water & Sewage* magazine; Mr. Max J. Kleiner, Consultant in Food Sanitation; Mr. Samuel A. Coleman, Consultant in Food Sanitation; Mr. Floyd C. Taylor, Sanitary Engineer, United States Public Health Service; Mr. Hugh R. Pomeroy, Director, Westchester County Planning Commission.

A number of students were provided the opportunity of working in various health agencies in the metropolitan area in fields of special interest to them. Such agencies included the Quarantine Station of the United States Public Health Service in New York and the water treatment, sewage treatment, and disposal facilities of the metropolitan area.

Professor Jacobson returned to the Virgin Islands during the summer of 1952 to gather additional information for a survey on the sanitation of St. Croix and St. Thomas that he had made during the previous summer under the auspices of the United States Public Health Service.

DEPARTMENT OF RADIOLOGY

Professor Ross Golden, Executive Officer

There have been many changes in the staff of the Department during the academic year 1952–1953. Dr Russell Wigh, formerly Assistant Professor of Radiology at the Jefferson Medical College in Philadelphia, was appointed Assistant Professor of Radiology in September, 1952. Two of the residents who completed their training in 1952–1953, Dr. Alfred Berne and Dr. Pablo

L. Morales, were appointed as Instructors. Unfortunately, because of a vital need for his services in Puerto Rico, Dr. Morales was forced to resign and return there only one month after his appointment. Other resignations and calls to the military service have left the Department with a very reduced professional staff at present. Dr. Marjorie LeMay moved to Boston where she is radiologist in a Veterans Administration Hospital. Dr. Edward Julien resigned to practice in northern New York. Major Wilson Scott of the United States Army Medical Corps, who was in training here, was transferred elsewhere on June 1 because of the closing of the R.O.T.C. in the College of Physicians and Surgeons of which he was the Commanding Officer.

Once again during the past year there were several requests from undergraduate medical students to take radiology as their elective, and during the months from October through May ten students, each for a period of one month, observed the work of the Department.

The routine Wednesday radiological conferences, which are held in the amphitheatre of the Babies Hospital from 5 to 6 P.M., have continued during the year under the supervision of Professor Josephine Wells, with speakers from other hospital services and other institutions lecturing on such subjects as mastoids, newer methods of laminography, hiatus hernia, tomography of the larynx, etc. Professor Golden gave a series of five lectures on the small intestine.

Many members of the staff have been invited to participate in scientific meetings in various parts of the country. Professor Golden presented a paper on "Early Detection of Gastric Ulcer" before the American Cancer Society in New York. He was Delegate of the American College of Radiology to the Fourth Inter-American Congress of Radiology in Mexico City in November, and there gave a paper on "Some Studies on Gas Distention in the Small Intestine." This paper was repeated in April together with a second paper on "Growth Characteristics of Cancer of the Stomach" at the request of the Arizona Medical Association in Tucson. In February he spoke on certain functional disorders of the small intestine at the Watts Hospital in North Carolina; in March he was guest of honor of the Dallas Southern Clinical Society and presented two papers; and at the American Medical Association meeting in New York in June he read a paper entitled "X-ray examination in Organic Disease of the Small Intestine," a study of 199 cases of organic disease of the small intestine, made in collaboration with Dr. Pablo L. Morales, to determine the efficacy of x-ray examination in the diagnosis of these diseases.

Professor Golden's publications during the year were: "Some Functional Disorders of the Small Intestine of Clinical Importance (Carman Lecture)," *Minnesota Medicine,* October, 1952; "Early Detection of Carcinoma of the Stomach," *Cancer,* March, 1953; and "Centers of Ossification of the Skeleton" (with Dr. B. R. Girdany).

Professor Golden was again Chairman of the Committee on Foreign Affairs

of the American College of Radiology and continued as Area Consultant for the Veterans Administration. He was appointed Delegate from the American College of Radiology and Chairman of the Delegation from the United States to the forthcoming Seventh International Congress of Radiology, to be held in Copenhagen in July. In December he was awarded the Gold Medal of the Radiological Society of North America at their meeting in Cincinnati. The retirement next year of Dr. Golden as Professor of Radiology and Director of the Radiological Service of the Presbyterian Hospital has been announced; and he has accepted a postretirement position as Visiting Professor of Radiology at the Medical School of the University of California at Los Angeles.

Professor John Caffey has given many outside lectures, in addition to having carried on his routine Hospital and College duties. He was guest lecturer for the North Pacific Pediatric Society, Sun Valley, Idaho, and for the Medical School of Howard University, Washington, D. C. He spoke on primary tuberculosis before the Pittsburgh Pediatric Society, on congenital dislocation of the hip before the Nassau County Pediatric Society, and on congenital obstructive lesions of the gastrointestinal tract before the Gastro-enterological Society of Lenox Hill Hospital, New York. Other papers were presented for the American Academy of Orthopedic Surgery, Chicago, the New England Roentgen Ray Society, Boston, the American Medical Association in June, the Central New York Roentgen Ray Society, etc. Papers published by Professor Caffey during the year were: "Chondroectodermal Dysplasia—the Ellis-van Creveld Syndrome," *American Journal of Roentgenology, Radium Therapy, and Nuclear Medicine,* 1952, and "On the Natural Regression of Pulmonary Cysts during Early Infancy," *Pediatrics,* 1953.

Professor Harold W. Jacox, as representative of the Presbyterian Hospital and Columbia University, attended the Teletherapy Evaluation Board Meeting at Oak Ridge, Tennessee. The purpose of the meeting was to investigate, develop, and evaluate radioisotopes for teletherapy. He was appointed by the Section on Radiology of the American Medical Association to the Local Committee on Arrangements for its Annual Session, held in New York City in June. Since September, 1952, Professor Jacox has been serving as secretary to the New York Roentgen Society, but he has now been elected Vice-President of the Society and will occupy this new post beginning July, 1953. He has also been elected chairman of the Section of Radiology of the Medical Society of the State of New York. Again this year Professor Jacox gave a postgraduate course on tumors of the head and neck to the dentists of the New Jersey State Department of Health and the New Jersey State Dental Society. A demonstration of the Department's apparatus and technique was included in the course. Among several papers presented by Professor Jacox during the year were "The Value and Limitations of Radiation Therapy" at the County Medical Society meeting in Lewistown, Pennsylvania, and before the Hudson Medical Society and the Union County Medical Society of New Jersey, and "Some Ex-

periences in the Use of Radioactive Materials" at the Flint Academy of Surgery, Flint, Michigan. In April he spoke at the meeting of the Philadelphia County Medical Society, with particular reference to radiation therapy in blood diseases.

Professor Juan M. Taveras has been carrying a heavy teaching schedule which, in addition to the usual lectures to the undergraduate students in the College, includes series of lectures attended by postgraduate students and the resident staff in neurology and neurosurgery, as well as lectures to psychiatric residents. Professor Kligerman was promoted to the position of Associate Professor of Radiology. Other promotions were those of Dr. Solomon Schwartz and Dr. Gerhart Schwarz to Assistant Professors in Radiology.

Different problems under investigation by members of the staff include the following. Dr. Berne is making portal venographic studies through the injection of the spleen to demonstrate metastatic neoplasm of the liver and retroperitoneal disease and to study portal hypertension. The investigation could be carried on more efficiently with a rapid changing angiocardiographic device which would make larger radiographs than can be made with present equipment. Dr. Samuel Madell is making a study of cases with total colectomies and ileosigmoidostomies as regards compensatory dilatation of the terminal ileum following colectomy. Dr. Jerome Nadelhaft continues his work on the evaluation of the effect on salivary gland tumors in radiotherapy —the study is conducted by Professor Arthur Purdy Stout. The grant from the Damon Runyon Memorial Fund for Cancer Research is being continued for the hospitalization of patients requiring steroids and radioactive gold. This investigation is being supervised by the Committee on Research, Council on Pharmacy and Chemistry, Subcommittee on Steroids and Cancer, of which Professor Kligerman is a member. A study of the practical adaptation of graphics in localizing radium implants is being carried out by Professors Kligerman and Howard W. Vreeland, School of Engineering, Columbia University. A preliminary paper was presented by Professor Vreeland in Omaha in January. A grant from the Damon Runyon Memorial Fund made this work possible. The use of Dramamine and Pyridoxine in radiation sickness in a clinically controlled experiment was begun in October by Professor Kligerman, Dr. Anna Silverman, and Professor John Fertig, School of Public Health. Professor Taveras and Dr. Gerhart S. Schwarz are working on a new type of stylet which would enable them to aspirate pantopaque after myelography with greater ease. Drs. Catherine Dalton and Solomon S. Schwarz are studying the anatomy of the paravertebral shadow in the thoracic region and the causes of variations therein. They have concluded that these variations are caused by posterior pleural reflections. With the help of a grant from the United States Public Health Service, Professor Virginia K. Frantz of the Department of Surgery and Professor Kligerman have undertaken a study of carcinogenesis in the thyroid of the Long-Evans rat from internal

and external radiation. Dr. Gerhart Schwarz has been working on the design for a Slide Rule for the correction of anatomical measurements in roentgen cephalopelvimetry. At present this is being manufactured and will be distributed by the Picker X-ray Corporation in the fall.

The angiographic room which had been so badly needed is now installed with new equipment on the third floor. It is not yet in use because a technician has not been available for this purpose. Dr. Berne has been placed in charge of angiography from the radiological service.

A grant has been made by the United States Public Health Service to the Presbyterian Hospital for the purchase of a 24 million volt betatron. The purpose of the grant is to inaugurate a study of the effects of 24 million volt X rays on cancer. The biological effects of the electron beam will also be investigated. Problems connected with the installation of this equipment and its relation to the radiotherapy division of the Radiological Service are being investigated.

The work of the Radiological Research Laboratory has continued along the lines described in previous reports. There are two separate activities: the research project for the Atomic Energy Commission and problems allied with therapeutic radiology and with medical uses of radioactive isotopes.

The research project for the Atomic Energy Commission consists of two parts: one concerned with radiological physics and the other with radiobiology. These studies employ most of the time of Professor Rugh and Rossi and a considerable technical and clerical staff. The work in radiological physics involves the development of new methods of measuring radioactive isotopes and tissues doses in terms of energy absorbed per gram of tissue under various conditions and for all forms of ionizing radiation. The work in radiobiology involves the study of the biological effects of ionizing radiation of particular interest to the Atomic Energy Commission. A full report of the work of the Project has been issued by the Atomic Energy Commission as Document No. NYO-4523.

Problems relating to clinical use of radioisotopes and to radium and x-ray dosage are mainly under the supervision of Professor Quimby. The radioisotope laboratory receives and standardizes all radioactive isotopes of iodine, phosphorus, gold, sodium, and potassium, and dispenses them to clinical and research departments. In cooperation with the medical, surgical, and radiological departments regular diagnostic and therapeutic procedures are carried out. New researches involving the use of isotopes in other departments may be started with the aid of personnel and equipment of the isotope laboratory and, later, transferred to the interested group for continuation. The reports from the various departments will contain information regarding their routine and research projects involving radioactive isotopes.

A little over a year ago the institution received from the Atomic Energy Commission a "general authorization for the use of radioactive isotopes in

human beings." Under this authorization projects for the use of these substances are not subject to review by the Subcommittee on Human Applications of the Advisory Committee on Isotope Distribution. Instead, the necessary review is done by the institution's own isotope committee, under the chairmanship of Professor Failla. This procedure has greatly simplified and expedited our obtaining isotopes but has considerably increased the responsibility of the committee.

Work on studies of dosage problems in x-ray and radium therapy, in cooperation with the therapeutic radiologists, has continued. This has been supported by a grant of $8,521 from the American Cancer Society, which has been renewed for the coming year. Mrs. Victoria Castro and Mr. Charles Soifer are research assistants under this fund. A paper based on part of their work will be presented by Professor Quimby at the International Congress of Radiology in Copenhagen in July.

Professor Failla has continued to be active in work with the Atomic Energy Commission and other government agencies, both civilian and military, on problems related to atomic energy. He is a member of the Advisory Committee for Biology and Medicine of the Atomic Energy Commission and the National Committee on Radiation Protection and is a consultant to several of the Atomic Energy Commission installations and the Armed Forces Special Weapons Project; he is chairman or member of various committees dealing with the protection of personnel from ionizing radiations, radiobiological research, radiological instrumentation, and medical applications of radioactive isotopes. Professor Quimby is a member of the Advisory Committee on Isotope Distribution of the Atomic Energy Commission and of the National Committee on Radiation Protection. She is a consultant for the American Medical Association, the Veterans Administration, and the National Research Council; she is an examiner for the American Board of Radiology and on the editorial advisory boards of *Radiology, Cancer,* and *G.P.*

Professors Failla and Quimby continue to be members of the Subcommittee on Graduate Instruction for work in Biophysics. Several courses have been offered particularly for students in this field by Professors Failla, Quimby, Roberts, Rugh, and Harald H. Rossi. Professor Quimby has also given regularly scheduled courses in radiological physics and in medical and biological uses of radioactive isotopes. The fellows in Radiology continue to devote some time during their final year to work in the Radiological Research Laboratory with the special purpose of obtaining some familiarity with radioactive isotope procedures.

Professors Quimby and Rugh are actively participating in programs for Civilian Defense, being especially concerned with various aspects of radiological safety. Professor Rugh is Radiac Officer in Charge of Borough of Manhattan.

Professors Failla, Quimby, Rugh, and Rossi have appeared on the programs

of national and local radiological, medical, physical, and other societies and have given a number of lectures to medical and lay audiences, many of these having been on topics connected with the applications of atomic energy in biology and medicine.

Professors Failla and Quimby were delegates to the Fourth Inter-American Congress of Radiology, held in Mexico City in November, 1952.

Professor Quimby was elected President of the American Radium Society for the current year. She gave the William Welch Memorial Lecture at Mt. Sinai Hospital in March, 1953, on the subject of "The Use of Radioactive Isotopes in the Establishment of Geological and Archaeological Dates." She also gave the George Holmes Memorial Lecture of the New England Roentgen Ray Society in May, 1953, on "Radioactive Isotopes as Aids in Medical Diagnosis." She also appeared on several radio and television programs featuring the subjects of civilian defense or radioactive isotopes. One of these, a half-hour television program in the "Horizons" series, also featured Miss Charlotte Schmidt, Miss Patricia McClement, and Dr. Jerome Nadelhaft, all members of the laboratory staff.

Professor Rossi and Mr. Gross participated in the Nevada atomic bomb tests this past spring.

Several papers have been published during the year by members of the laboratory staff, and several others are awaiting completion.

The work done on the Government Contract is described in the *Annual Report to the Atomic Energy Commission.*

DEPARTMENT OF SURGERY

Professor George H. Humphreys, II, Executive Officer

There have been no important changes in the staff during the past academic year. On July 1, 1952, Dr. LaRoy Dietrich was appointed as Research Assistant in Biochemistry by Professor Hans T. Clarke and assigned to the Department of Surgery on our request. Dr. Dietrich's interests in enzyme chemistry make him a valuable member of the group which is exploring the effects of antimetabolites on growth of experimental tumors. A laboratory has been set aside for him in the Institute of Cancer Research and equipped through the generosity of Mr. Reginald Auchincloss. On February 1, 1953, Dr. Charles W. Findlay, Jr., was granted leave of absence for military duty. Dr. John Prudden, whose appointment on May 1, 1952, as Instructor was immediately followed by a call to military duty, has also been on leave of absence.

The division of the Presbyterian Hospital Surgical Service into three units, which was begun in the previous year, functioned well and proved to be of considerable value in teaching in the fourth year. The clerkship that was begun in June, 1952, for the class graduating this year has been a far more valuable experience than the previous third-year clerkship, although its limita-

tion to a period of one month makes it difficult to include as much material as we would like. The teaching of graduates on the resident level has been improved in effectiveness through adjustments in schedule. Although it seems probable that our large volume and variety of clinical activity could be utilized to train more men, reluctance on the part of the Hospital to enlarge the resident staff has kept it at a stationary level. At the same time, teaching possibilities, especially for foreign students, have been restricted by the elimination of clinical fellowships. Research fellowships have continued, as have American Cancer Society fellowships. In addition, a new postgraduate course in the principles of cardio-vascular surgery, which was attended during the past year by surgeons from Argentina, Brazil, Portugal, and Cuba, has been set up.

Research has continued along lines previously established. The metabolism unit has carried out fundamental studies of fluid and electrolyte changes in surgical patients. The management of cirrhosis with ascites has been of special interest to Professor David V. Habif, who has remained in charge of this unit. The studies of hemodynamic changes in surgical patients, especially in cases of portal obstruction and congenital heart disease, being conducted by Drs. Hugh F. Fitzpatrick and Samuel R. Powers, Jr., in association with Professors Arthur H. Blakemore and George H. Humphreys, have proved especially fruitful. Dr. Ralph A. Deterling, Jr., has continued his studies of vascular grafts. Dr. Edmund N. Goodman's work on the electrogastrogram has, with the valuable assistance of Mr. George Katz, entered a new phase of greater precision. The work of Professor Edward L. Howes, in association with Professor John D. MacLennan, on the production and use of debriding enzymes in the treatment of slough due to burns is proceeding satisfactorily.

In the Institute of Cancer Research Professor Margaret R. Murray LeDoux's program of studies of neoplastic disease at the cellular level continues. Professor Cushman D. Haagensen's studies on the milk factor have also continued along the direction of immunological investigation in conjunction with Professor Michael Heidelberger. Dr. Daniel M. Shapiro's studies of the effects of combinations of agents in controlling growths of transplanted neoplasm have received new impetus through support from the Damon Runyon Foundation. Closely related to this work is a laboratory of enzyme chemistry organized by Dr. LaRoy Dietrich. The work of Dr. Maurice Shils's laboratory has been enhanced by additional space and personnel.

The laboratory of Surgical Pathology has continued its high level of service activity. Professors Raffaele Lattes and Virginia K. Frantz have continued in their research activities, and the former has assisted Dr. Gabriel C. Godman in establishing a laboratory for histochemistry. Studies of tumor metastases by clearing methods have been pursued by Professor Robert S. Grinnell and Dr. John W. Pickren. Studies of antibiotics, especially bacitracin, have been conducted by Miss Balbina Johnson in the Surgical Bacteriology laboratory.

The staff has been very active attending meetings and presenting papers.

Over fifty presentations were made by fourteen members of the staff at out-of-town meetings. Professor Frank L. Meleney visited the principal clinics in South America and Mexico with members of the Society of Clinical Surgery. Professor Jerome P. Webster attended the Sixth Latin-American Congress of Plastic Surgery at Asuncion, Paraguay. Professors Deterling and George H. Humphreys gave a series of lectures at Bogota, Colombia, on invitation of the local surgical society. In addition, many members of the staff took active parts in the meeting of the American College of Surgeons in New York in September, presenting papers in the Forum on Fundamental Sciences, postgraduate courses, cine clinics, exhibits, and operations which were transmitted by television to the convention hotel. At the American Medical Association meeting in June, also in New York, the staff was similarly active. Thirty-seven papers were published during the year. This is a smaller number than usual and reflects the dislocation of the laboratories during the previous year.

DEPARTMENT OF UROLOGY

Professor George F. Cahill, Executive Officer

The Department of Urology has regrouped the teaching of the senior class with participation of younger instructors in direct student patient teaching. The weekly hours of teaching have again been restricted. The thesis-report type examination has been continued as a means to interest the student in reading and thinking in some part of urology. We are happy to report that the theses as a whole have been very well done.

There have been no resignations from the staff. Drs. Ralph Veenema and Alex Finkle have been appointed Instructors in the Department. Drs. Arthur T. Wiletts and Robert Kollmar have been appointed Assistants in the Department. Dr. Harry Seneca, Research Associate on the staff, has been appointed Assistant Professor of Microbiology and assigned to the Department of Urology.

During this year, Professor Seneca pursued his studies on antibiotics and on antituberculosis drugs and investigations on steroid and on enzyme factors polysaccharide. He is also setting up studies in other related fields. In his antibiotic studies he completely worked up the spectrum of Thiolutin and Rimocidin. Both of these antibiotics and particularly Thiolutin are extremely effective against bacteria, fungi, and protozoa. Thiolutin has been found to be active against flagellates (trypanosomes, leishmania, trichomonas, and amoeba). Clinic trials using Thiolutin in trichomonas infections are in progress. He has been developing a practical and simple method of screening antibiotics against protozoa. He has studied the effect of 15 antibiotics on Trichomonas vaginalis and Trichomonas foetus. He has also studied the

effects of 15 different antibiotics on the human spermatozoa—some had no effect; some, a deleterious effect, and some, probably an augmentative effect as far as activity is concerned. Attempts were also made to obtain and isolate substances supposedly having antibiotic properties from saprophytic and pathogenic protozoa. He also determined the antibiotic concentrations in the testes of animals receiving antibiotics over a period of six to eight weeks. Studies were also made upon the effect of antibiotics upon spermatogenesis in the laboratory animal. Since isonicotinic acid hydrazide was introduced as an antitubercle bacillus agent, he investigated the effect of this agent on cultures of protozoa. During the past year he continued the depressing effect on the resistance of an animal by the administration of cortisone. He has shown that in an animal which is naturally immune against a pathogen the pathogen when introduced may not be destroyed but kept in a constant state of inhibition or suppression. When a shocking dose of cortisone is administered to such an animal after an interval of two to three months following the introduction of the pathogen, that animal will have an acute, fatal infection from the pathogen. The suggestion is that some such mechanism might be set in motion when an individual comes down with a cold when subjected to a draught, or has had too much alcohol, or has had anesthesia or a vasomotor shock which reduces the resistance in the presence of a harbored virus, either inhibited or suppressed. Similar mechanics are probably involved in the activation of herpes virus after exposure to an excess amount of sunlight or ultraviolet rays or febrile reaction to foreign protein. The glucocorticoids apparently have action which results in lowering the resistance, so a latent infection is activated. He has shown that Compound S (17 hydroxy 11 desoxycorticosterone) does not depress the immune mechanisms of an animal, and, also, that if Compound S is given a week or ten days prior to E (Cortisone) there is some indication that the animals may be protected against E (Cortisone). It was also shown that it was feasible to produce fatal amebiasis in mice, which are usually resistant, with cultures of *Endamoeba histolytica* when injected at the same time with cortisone and penicillin. A method has been tried in the attempt to obtain from bacterial cultures collagenase, an enzyme which could be used for experimental work upon collagen diseases and various carcinomas. This attempt is still under trial. A vorticella-like organism on the shell of the snail (Australorbis globratus) has been isolated. This organism has the power to destroy and dissolve the shell of the snail. Attempts are being made to obtain the active factor from the cultures in the hope that it may prove to have some action against the urinary and biliary calculi in man. Isolation of a potent proteolytic enzyme from the cercaria of schistosome is underway. This enzyme should have an action similar to trypsin, and its effect will be determined experimentally. Recently a polysaccharide fraction (pyrogenic factor) has been obtained from protozoa. This, if isolated, may be experimentally used as a stimulant of the adrenal

cortex. There is now being set up a study of cortisone analogues in relation to their antiinfective and anticarcinomal properties. This opening has received considerable interest since it has been shown that human cancer will grow in animals under the influence of cortisone, and animals with carcinoma show an increased invasion under cortisone. Methods have shown that bacteria and protozoa have specific proteins, and because of this it is possible to simplify the laboratory diagnosis of an organism by means of paper electrophoresis or paper chromatography. Various component parts of serum protein can be separated by such procedures. Attempts are being made to find a practical method of putting material from a patient on such paper and determining the Rf. This method, if practical, would be useful both in infections and in tumor invasion.

Professor John K. Lattimer continued to act in the capacity of Attending Consultant to the comprehensive research project on the chemotherapy of genitourinary tuberculosis at the Kingsbridge Veterans Administration Hospital. There is a concentration of such cases under the Veterans Administration that is unique in the United States. Data has been published on a six-year study of over 600 patients with various combinations of chemotherapy and surgery. The treatment of renal tuberculosis with Isoniazid, Streptomycin, and PAS has been described with principles of use. A separate publication called attention to the dangers attendant with the use of Isoniazid in patients who are in or close to uremia. During the year a roentgenological classification of tubercular lesions of the kidney, which has been used at the Research Unit, was reported. Also, a study upon the value of partial nephrotomy for tuberculosis, in which the technique used was described and evaluated, was reported. All this was done under cover of chemotherapy. A prize-winning exhibit on the chemotherapy for renal tuberculosis was shown among the scientific exhibits of the American Medical Association Annual Convention in New York City in June, 1953. A paper and a movie on the radical retropubic operation for cancer of the prostate gland were also presented at the American Medical Association Meeting. A similar movie was shown before the television camera at the American College of Surgeons Meeting in 1952. A report on a study of pediatric urology at the Babies Hospital and the Squier Urological Clinic was presented at the meeting of the American Medical Association in St. Louis. This covered the study of over 2,000 urological pediatric cases. During the year, new techniques for studying the problem of congenital hydronephrosis has been developed in conjunction with Dr. James B. Campbell of the Department of Neurological Surgery. This has interestingly approached these difficult congenital disturbances from a new neurological angle. During the year, Professor Lattimer wrote the chapter on the treatment of genitourinary tuberculosis for the medical book *Current Therapy*. He gave addresses on this subject before the University of California Medical School, the Stanford University Medical School, the Inter-

national College of Surgeons, the Ohio State Medical Association, the American Academy of Tuberculosis Physicians, the Government Symposium on the treatment of tuberculosis, and the University of North Carolina Medical School. Professor Lattimer has also continued his supervision of the Resident Journal Club Meetings and other resident teaching activities.

Professor Perry B. Hudson's group, which is working in the Francis Delafield Hospital as well as in the laboratories both there and on the fifteenth floor in the new Cancer Research Laboratories, now includes at the professional level: Professor John M. Reiner and Drs. Morris London, Kenneth Tsuboi, T. D. Price, and Michael Lombardo. The cancer research projects which have been undertaken by this group in the department are now supported by grants-in-aid and contracts from the Atomic Energy Commission, the United States Public Health Service, the American Cancer Society, the Damon Runyon Memorial Fund, the New York City Cancer Committee, the American Urological Association, the City of New York, and the Adrenal-Physiological Research Gift. This last fund was created during the past year through the generous contributions of the MacAndrews-Forbes Company and the Schering Corporation. During the past year Professor Hudson participated in panel discussions or delivered lectures upon topics dealing with genitourinary cancer at Cornell University College of Medicine, McGill University, the Royal Victoria Hospital, the Johns Hopkins Hospital, the meeting of the New York Radiological Society, the New York Hospital, as well as at a series of cancer teaching discussions held under the sponsorship of the State of New Jersey and local medical societies at Monmouth, Newark, and Trenton, New Jersey. Professor Hudson also conducted a symposium at the New York University-Bellevue Medical Center on supervoltage therapy of genitourinary tumors. The effect of bilateral total adrenalectomy upon disseminated cancer, particularly of prostatic and mammary origin, has been further elucidated. Professor Hudson and his group at the Francis Delafield Hospital have now concluded that adrenalectomy for prostatic cancer is rarely if ever indicated. Studies on the clinical effect of adrenalectomy upon mammary cancer, especially in combination with surgical ovariectomy, are being continued. During the course of this clinical experiment a new thoracolumbar extrapleural surgical incision for adrenalectomy and an approach to other structures in the retroperitoneum has been developed and reported. A technique for cannulating the central adrenal vein has also been perfected, and for the first time large amounts of effluent adrenal blood of human origin has been made available for study. The studies at present underway include the analysis of steroid substances normally contributed to the body by the adrenal cortex as well as an evaluation of the same group of chemical compounds following stimulation with ACTH. Tissue studies of ascorbic acid levels, made by Professor Hudson, in collaboration with Professor Frederic J. Agate, Jr., of the Department of Anatomy, have been continued and the

initial results published. This work at present is being shifted mainly to place emphasis upon adrenal and peripheral blood since the tissue levels have essentially been defined. Of particular interest to endocrinologists engaged in experimental work is the recently developed asteroidal maintenance for periods of one month and more by the administration of the monoammonium salt of glycyrrhizinic acid, which is derived from licorice roots. By utilizing this clinical regimen it has been possible to establish the fact that after the gonads and the adrenal glands have been removed there is no remaining tissue in the human body which is capable of producing 17-Ketosteroid substances. This steroid chemical work has been performed both in Professor Hudson's laboratories and through a collaborative effort with the Worcester Foundation for Experimental Biology in Worcester, Massachusetts. In addition, urine collections from adrenalectomized patients—maintained by cortisone acetate administration—have been supplied to the laboratories of Dr. Seymour Lieberman, Associate Professor of Biochemistry in the Department of Obstetrics and Gynecology. The results and direction of this research are reported in the section given by that department. Professor Hudson recently collaborated with Professor William Wallace Scott of the Johns Hopkins University as coauthor of a book entitled *Surgery of the Adrenals,* published by Charles C. Thomas. Adrenalectomy in laboratory animals has been utilized also in an attempt to document those alterations in the synthetic enzyme systems of the liver, kidney, testis, and prostate which occur as a result of the hormone depleting surgery. These investigations have also been extended to include bilateral orchiectomy—striking alterations in at least one synthetic enzyme system as a result of the operation have been established. During the past year the Department of Urology of the Francis Delafield Hospital has been expanded to embrace a 51 bed ward, managed by a staff of five residents and two research Fellows. During the past 12 months more than 500 surgical operations have been performed by the residents. As a result of this growth and development the service has been fully approved by the American Medical Association and the American Board of Urology for the training of specialists. The nucleic acid studies on human testis and kidney are being continued under the third-year renewal of an Atomic Energy contract awarded to the University for a project outlined by Professors Hudson and Reiner and Doctor Price. A new apparatus for vascular perfusion experiments has been designed and is now being utilized for the experiments. Through collaboration with other departments it has been possible during the last year to secure several normal human kidneys for this kind of investigative work. This research has been facilitated by the development and utilization of a new instrument designed by Dr. Price for the rapid identification of nucleic acids following paper chromatographic separations. The studies on synthetic enzyme systems in the human prostate gland have been continued for a second year, and the original observations have been pub-

lished. Professors Hudson and Reiner have altered the studies to include a wider spectrum of enzymatic reaction and expect to continue this line of investigation for several years. The studies on both serum and tissue acid phosphatase have resulted in the publication of a total of five articles in scientific periodicals during the past year. These articles were written by Professor Hudson and Drs. Tsuboi and London. A refined method for the clinical determination of acid phosphatase levels has been devised, and is being utilized for precise testing in the clinical research program. In addition, there has been developed a method which in certain instances will preclude the false negative acid phosphatase tests which have been encountered in the past. Dr. Casimer T. Wolan has participated with Professors Hudson and Reiner in studies upon the oxidative phosphorylation of prostatic, hepatic, renal, and testicular tissues in animals. The original findings from the experimental data have prompted at the present time a shifting of emphasis to several of the glycolytic enzymes. Professor Hudson and Dr. Tsuboi have conducted clinical experiments designed to explain the metabolism or fate of prostatic acid phosphatase which has entered the blood stream as a result of dissemination of prostatic malignancy. A promising theory concerning the role of the liver in metabolism of acid phosphatase has been described. During the past 6 months a steroid chemical laboratory was opened on the fifteenth floor in the Cancer Institute Laboratories. Professor Hudson and Dr. Lombardo have secured three grants-in-aid for the pursuit of several problems in steroid metabolism. The survey of aging males in the New York City population which was begun three years ago has been continued. The program has now reached the point where more than 300 men have been admitted to the Francis Delafield Hospital and subjected to open surgical biopsy of the cancer-bearing portion of the prostate gland. A classification for prostatic cancer, which was developed in collaboration with the Department of Pathology at the Francis Delafield Hospital, has been utilized in the appraisal of malignant potential of the cancers uncovered during this survey study. A much clearer idea concerning the unsuspected incidence of prostatic cancer in the living male population, particularly in the older age groups, has been obtained. Professor Hudson and his associates have recently published several articles based on findings of the survey program. In collaboration with the Department of Medicine, the study on preoperative cardiac preparation of surgical patients has been continued to a point where more than 250 patients have been evaluated. This work has been done as a joint research with Dr. Menard M. Gertler. Professor Hudson and Dr. Gertler have also published the first results of the serum lipid study which was begun in 1951. Recently an additional Public Health Service research grant-in-aid was obtained by Dr. Gertler and Professor Hudson for the continuation of the lipid fractionation experiments. Although these experiments are primarily of a medical nature, since the ultimate object of study is blood vessel changes, patients in the Urological

Service fall into an age group that provides an extremely high percentage of arteriosclerotic and atherosclerotic individuals.

Professor Meyer M. Melicow presented a study of bladder tumors before the South Eastern Urological Association in its meeting in Havana, Cuba. He also took part in a seminar discussion in Miami on exfoliative cytology as applied in diagnosis of carcinoma of the urinary tract. At the annual meeting of the American Urological Association in St. Louis he presented a discussion on the classification, symptoms, and diagnosis of pheochromocytoma. He finished a study with Professor George F. Cahill on plasmacytoma of the testis. His study on retroperitoneal tumors presented at the International College of Surgeons has been published. He continued his pathological urological seminars with the resident and attending staff during the year.

Professor Charles T. Hazzard was elected President of the New York Urological Society during the year. Professor John N. Robinson served as Chairman of the Public Relations Committee of the American Urological Association. He was also reappointed as Chief Consultant in Urology to the Veterans Administration for a five-year term. He was also a member of the Executive Committee of the New York Section of the American Urological Association. During the year, he completed a study on the use of sulusponge in urological procedures and presented a report to the American Association of Genito-Urinary Surgeons. He also presented a report on a one-year study on mortality in prostatic pathology made for the Veterans Administration. He and Professor Earl T. Engle continued their work on the cryptorchid testis and presented their observations in a report at the meeting of the American Urological Association.

Professor George W. Fish was appointed Senior Civilian Consultant in Urology to the Surgeon General of the Army. He was also elected a Trustee of the Research Society of Urology, Incorporated. During the year, a study on the surgery of carcinoma of the penis was undertaken in association with Professor Perry B. Hudson and Dr. John Hopkins; this was completed and reported on by them. Professor Fish, with the same authors, also reported on a study of the advantages of large oral doses of diethylstibestrol in prostatic cancer.

Professor George F. Cahill was President of the Ninth International Congress of Urology held by the International Urological Society in New York in September, 1952. This was the first International Congress of Urology to be held in the United States. He was elected President of the American Urological Association and presided at its annual meeting in May, 1953. He completed his five-year service as a member of the Special Advisory Committee to the Veterans Administration. He continued his services as one of the original Trustees of the American Urological Research Foundation, Incorporated. He also continued his services as a member of the Board and Trustee of the American Board of Urology and during the year was elected

its President. During the year, he participated with the Puerto Rico Urological Society in San Juan in a symposium on adrenal surgery. He presented papers on studies of hydronephrosis with multiple hilar vessels at the North Central Section of the American Urological Association. He presented the results of a study on adrenal pathology at the Mid-Central Section Meeting at Hot Springs, Arkansas and a study on surgery of the adrenals at the Mid-Atlantic Section Meeting at Roanoke. He participated in the Post-Graduate Fortnight of the New York Academy of Medicine in endocrinology, presenting a lecture on pheochromocytoma, summarizing the work done on this disorder in the Department of Medicine and Urology. He gave a lecture on the surgery of adrenal pathology at the meeting of the American College of Surgery in Boston. He presented results of studies on ureteral transplantation in ectopia before the Florida Urological Society and studies in angiograms and retroperitoneal air insufflation in hematuria before the Florida State Medical Society. He gave the graduation address at the graduation exercises of the Naval Training Course at Bethesda. During the year, he continued his work on adrenal disorders with a number of reports in collaboration with Professor Joseph W. Jailer on the cortical aspects and Dr. Marcel Goldenberg on the medullary tumors.

The Department wishes to express its thanks to the number of friends who so kindly contributed to its studies and investigations.

MEDICAL LIBRARY

Professor Thomas P. Fleming, Medical Library

Twenty-five years ago this Library opened with less than 50,000 volumes and a stack capacity of approximately 85,000 volumes. Those who planned the Medical Center did not foresee the developments that would take place in patient care, medical education, and research. The advances in medical knowledge that have been made in the ensuing years have brought about momentous changes, not the least of which has been the growth of medical literature and its utilization. This broadening horizon of medicine has resulted in demands for literature which twenty-five years ago the Library would never have dreamed of providing. Consistent and steady demands for material in sociology, political science, physics, mathematics, and chemistry force the Library either to provide the material or to become a serious impediment to sanctioned activities.

Few people realize the breadth of activities of the Medical Library, and a brief statistical statement may be enlightening. The Library possesses approximately 180,000 bound volumes and an estimated 50,000 unbound issues of journals. It receives currently 2,140 individual journals, plus some 750 annual reports of institutions and organizations. Last year 60,000 issues of

journals were checked against the records and 45,000 were incorporated into the Library. The Library is used by more than 100,000 people each year—two and one-half times more than use the famous Library of the New York Academy of Medicine. These users take out of the Library more than 30,000 volumes—three times more than are taken out of the Academy Library. The readers call for from the stacks and use in the Reading Rooms more than 200,000 volumes—two times more than are used in the Academy.

In 1948 the Committee on Administration of the Faculty of Medicine in a report on "The Future of the Columbia-Presbyterian Medical Center" made this statement: "The overall program cannot move forward in proper balance until a modern library is built which would make it possible for that unit to participate even more actively in the teaching and research programs."

It is particularly gratifying to know that a campaign has been launched for funds with which to erect a new wing in order to provide expanded library facilities.

Changes in personnel during the year include the resignation of Emilienne Stordeur Lopat, as Chief Medical Reference Librarian, and her replacement by Erich Meyerhoff. Anne Powell was appointed Reference Assistant. George L. Yashur, Cataloguer, resigned to accept a position at the United States Naval Air Development Research Center. Virginia Sperl was appointed Chief Cataloguer and David Cone, Cataloguer. John Stratton, Library Assistant, Neurological Institute, resigned to complete his work for the doctorate. He was replaced by Mary Covington. Dr. Walter W. Jacobi was appointed Cancer Research Librarian at the Francis Delafield Hospital.

Teaching activities of the Library staff included orientation lectures to the entering students in nursing, physical therapy, and occupational therapy. Mr. Meyerhoff gave two lectures to the students in the Institute of Administrative Medicine on the use of the literature. Professor Fleming gave four lectures to the students in the School of Public Health, two lectures to the first- and fourth-year students in dentistry, and one lecture to the first-year students in the Medical School on the use of the literature.

Mr. Meyerhoff continued his study on bibliographic manuals for medical library users and submitted a report which was published in the "Bulletin of the Medical Library Association." In collaboration with Dr. Ilse Bry, Librarian of the New York Psychoanalytic Institute, he has prepared an analysis of monographic serials in psychiatry, neurology, psychoanalysis, and related fields. Preliminary results of the study were presented by Dr. Bry at the International Congress of Medical Librarianship in London in July, 1953.

Mr. Fred Pheulpin, Senior Acquisitions Librarian, made an analysis of the comparative costs of medical journals; his report was presented at the Medical Library Association meeting in Salt Lake City in June, 1953.

Professor Fleming prepared and published a "Guide to the Literature of Science" and a "Guide to the Literature of the Medical Sciences." These pub-

lications serve as basic texts for courses in the School of Library Service at Columbia, and the texts have been adopted by several other library schools. During the year, Professor Fleming served as consulting editor for "A Digest of Dental Science."

WILLARD C. RAPPLEYE, M.D.
Dean

June 30, 1953

COLUMBIA UNIVERSITY
BULLETIN OF INFORMATION

Fifty-fourth Series, No. 43 November 6, 1954

Report of the Dean of the Faculty of Medicine

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1954

COLUMBIA-PRESBYTERIAN MEDICAL CENTER
168TH STREET AND BROADWAY
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The series includes the Report of the President to the Trustees and the Announcements of the several Colleges and Schools relating to the work of the next year. These are made as accurate as possible, but the right is reserved to make changes in detail as circumstances require. The current number of any of these Announcements will be sent upon written application to the Office of University Admissions, 322 University Hall, Columbia University, New York 27, N.Y. Copies may be obtained in person from the Office of the Secretary, 213 Low Memorial Library.

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FACULTY OF MEDICINE

REPORT OF THE DEAN

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1954

The registration of the School of Medicine was as follows:

First year	120
Second year	122
Third year	114
Fourth year	113
TOTAL	469

Residents from forty-five states and twenty foreign countries, totaling 1,515 students from 250 colleges, applied for admission to the first-year class entering in September, 1954. The 120 accepted students received their liberal arts education in forty-three different colleges and came from twenty-seven states and three foreign countries.

The wide distribution of the applicants for admission and the acceptances are illustrated in the following figures:

Area	*Applicants*	*Acceptances*
New York City	556	47
New York State (exclusive of New York City)	159	11
Other states or territories	762	59
Foreign	38	3
TOTAL	1,515	120

The registration of the School of Dental and Oral Surgery was as follows:

First year	40
Second year	41
Third year	35
Fourth year	37
TOTAL	153

During the year, there were ninety-six students registered for non-credit postgraduate courses in the Dental School and forty-three students

registered for postgraduate credit courses. A class of twenty-four students was enrolled in the Courses for Dental Hygienists and twelve received the Bachelor of Science degree.

In the School of Public Health the registration was as follows:

D.P.H. candidates	2
M.P.H. candidates	34
M.S. candidates	68
TOTAL	104

The registration in the School of Nursing was as follows:

First year	132
Second year	114
Third year	90
TOTAL	336

During the past year there were 579 students from seventeen affiliated schools of nursing who received instruction under the Department of Nursing in various hospital and laboratory units of the Medical Center.

In the Course for Occupational Therapists forty-six students were registered, and in the Course for Physical Therapists, forty-seven students.

The following degrees were awarded during the year:

M.D.	111
Med.Sc.D.	4
D.D.S.	37
D.P.H.	2
M.P.H.	33
M.S. (Public Health fields)	68
B.S. (Nursing, Occupational Therapy, Physical Therapy, Dental Hygiene)	116

In addition to the students enrolled under the Faculty of Medicine there were sixty-six students registered under the graduate faculties of the University who took courses and advanced research work in the departments of the Medical School.

It is evident from the preceding figures that the Faculty of Medicine is responsible for the instruction of many more students, graduate and

undergraduate, than is commonly known. The total of medical, graduate, postgraduate, nursing, occupational therapy, physical therapy, dental, dental hygiene and public health students, visiting scholars, fellows, hospital residents, and younger staff members runs to over three thousand full-time and part-time students.

It is gratifying to report that during the academic year sixty-seven of the medical students received scholarships averaging about $432 per student.

Associate Dean Severinghaus served during the year as chairman of the Subcommittee on Preprofessional Education of the Survey of Medical Education and was author of the report, "Preparation for Medical Education in the Liberal Arts College." The group emphasized particularly the importance of a broad cultural rather than a narrow technical or scientific preparation as the basis of sound, present-day medical education. The committee under Dr. Severinghaus has made an important contribution to the whole field of professional education.

Associate Dean McCormack continues to serve as executive director of the Medical Advisory Committee to Selective Service for New York City. In order to satisfy the needs of the armed forces it is necessary to draft many physicians and dentists. It is important that the teaching staff of professional schools not be destroyed in the process. Dr. McCormack also serves with the Civilian Health and Medical Advisory Council of the Assistant Secretary of Defense for Medical and Health Affairs.

We are proud to report that Dr. Frank B. Berry, who is on leave from his post as professor of clinical surgery, occupies the important position as Assistant Secretary of Defense for Health and Medical Affairs.

The Janeway Prize, awarded to the graduate who, in the opinion of the faculty, has ranked highest in efficiency and ability, was given to George R. O'Connor. The Borden Undergraduate Research Award was given to Samuel Korman for outstanding research work during the medical course. Peter Westerhoff, Jr., Class of 1955, was awarded the Coakley Memorial Prize in otolaryngology. The Joseph Mather Smith Prize, awarded to the graduate whose essay or original research in medical subjects is deemed by the Committee on Award to be the most meritorious, was given to Dr. Earl D. Neslen, Class of 1949. The

Stevens Triennial Prize was awarded to Dr. Hattie E. Alexander for her work on the subject of the transmission of inherited traits in *Hemophilus influenzae*. The Dr. William Perry Watson Prize in pediatrics was awarded to Rodman D. Carter. The prize for excellence in pedodontics, awarded by the Class of 1929, was given to Adolph B. Carreiro. The Van Woert Scholarship Award and the Sigma Epsilon Delta Award were given to Charles J. Obernesser. The Alpha Omega Prize, the Rowe-Wiberg Medal, and the prize for excellence in operative dentistry were received by Vincent W. Hermida, Jr. The Ella Marie Ewell Certificate and Medal in dentistry were given to Howard P. Sanborn. Hans Baruch was given the Frederick Parker Gay Memorial Award.

It is with the greatest sorrow that we report the following deaths during the year:

Erwin Brand, Associate Professor of Biochemistry, on July 11, 1953
Earl C. Chesher, Assistant Professor of Clinical Neurology, on April 1, 1954
Eugene S. Coler, Associate Clinical Professor of Obstetrics and Gynecology, on August 30, 1953
LeGrand H. Hardy, Clinical Professor of Ophthalmology, on April 14, 1954
Felix E. Hoffman, Assistant in Psychiatry, on July 19, 1953
Marvin A. Lewis, Visiting Fellow in Neurology, on June 21, 1954
Clare Madden, Assistant Clinical Professor of Dentistry, on September 17, 1953
Henry Minsky, Associate Clinical Professor of Ophthalmology (Mount Sinai), on May 23, 1954
Frank H. Pike, Associate Professor of Physiology, Retired, on November 13, 1953
Lloyd S. Saltus, Assistant in Pediatrics, on June 20, 1954
Harry Strusser, Lecturer in Dental Public Health Practice, on May 17, 1954
Ralph Teicher, Assistant in Dermatology, on February 28, 1954
John R. West III, Assistant Professor of Medicine, on June 29, 1954
William H. Woglom, Professor Emeritus of Cancer Research, on August 8, 1953

The following designations were made during the year:

Harold W. Jacox, Acting Executive Officer of the Department of Radiology, for 1954–1955
Eleanor Lee, Acting Executive Officer of the Department of Nursing for 1954–1955
Irville H. MacKinnon, Acting Executive Officer of the Department of Psychiatry, from September 1, 1953, to June 30, 1954

Lawrence W. Sloan, Acting Executive Officer of the Department of Surgery, from July 1 to December 31, 1954

The following retirements are reported:

Ross Golden, Professor of Radiology and Executive Officer of the Department of Radiology, effective September 30, 1954
Robert L. Levy, Professor of Clinical Medicine, effective June 30, 1954
Arthur P. Stout, Professor of Pathology, effective June 30, 1954
Jerome P. Webster, Professor of Clinical Surgery, effective June 30, 1954

The following emeritus designations were made by the Trustees:

Ross Golden, Professor Emeritus of Radiology, from October 1, 1954
Robert L. Levy, Professor Emeritus of Clinical Medicine, from July 1, 1954
Arthur P. Stout, Professor Emeritus of Surgery, from July 1, 1954
Jerome P. Webster, Professor Emeritus of Clinical Surgery, from July 1, 1954

The following promotion was made during the year:

James B. Campbell, Assistant Professor of Neurological Surgery, from January 1, 1954

Effective July 1, 1954, the following promotions were made:

Dorothy H. Andersen, Associate Professor of Pathology
Stanley M. Bysshe, Associate Professor of Clinical Obstetrics and Gynecology
Robert W. Coon, Associate Professor of Pathology
Charles A. Flood, Associate Professor of Clinical Medicine
Samuel Graff, Professor of Biochemistry
Saul B. Gusberg, Associate Professor of Clinical Obstetrics and Gynecology
Harold D. Harvey, Associate Professor of Clinical Surgery
Joseph W. Jailer, Associate Professor of Clinical Medicine
Arnold J. Kremen, Professor of Clinical Surgery
Marvin Kuschner, Associate Professor of Pathology
Irving M. London, Associate Professor of Medicine
Karl Meyer, Professor of Biochemistry
Gilbert H. Mudge, Associate Professor of Medicine
Edith H. Quimby, Professor of Radiology (Physics)
Harald H. Rossi, Associate Professor of Radiology (Physics)
Rudolph N. Schullinger, Associate Professor of Clinical Surgery
David Shemin, Professor of Biochemistry
Warren M. Sperry, Professor of Biochemistry
David Sprinson, Associate Professor of Biochemistry
Charles M. Steer, Associate Professor of Clinical Obstetrics and Gynecology
Wellington B. Stewart, Associate Professor of Pathology

Heinrich B. Waelsch, Professor of Biochemistry
Shih-Chun Wang, Professor of Physiology
Sidney C. Werner, Associate Professor of Clinical Medicine

The following new appointment was made, effective July 1, 1954:

Lawrence C. Kolb, Professor of Psychiatry and Executive Officer of the Department of Psychiatry

THE GRADUATE AND POSTGRADUATE PROGRAM

During the year there were 456 physicians enrolled in sixty-one continuation courses. In addition, over one hundred physicians were enrolled in a special course given by our staff for the American College of Physicians. Formal course offerings, however, do not reflect the full extent of the faculty's interest in postgraduate medical education. Members of the staff are participating constantly in programs sponsored by medical and scientific organizations throughout the country. For example, a series of fifteen color-television broadcasts sponsored by the American Cancer Society originated in the Medical Center. These programs, sent over closed circuits to practicing physicians in seven major cities in the northeastern part of the United States, were devoted to various aspects of cancer. Our staff also participated in a series of radio alerts on cancer sponsored by the New York Academy of Medicine, and conducted a series of conferences for general practitioners in the New York area at the request of the New York City Cancer Committee.

The influence of the G.I. Bill on the demand for postgraduate courses among physicians who are veterans has virtually disappeared. The postwar demand subsided about 1950. Yet there is a persistent need for continuation courses, and satisfaction of the greater part of this demand appears to come from organizations which are not primarily educational institutions. Only one quarter of the physicians enrolled in refresher courses throughout the country are registered under academic faculties.

In addition to numerous physicians and educators from various parts of the world who visited the Medical School and Medical Center for brief periods and informally, there were eighty-eight visitors in medical sciences from thirty-six countries who came to the Medical Center for extended periods of study during the past year. We have far more inquiries from physicians and scientists in all parts of the world than we can possibly accommodate.

Thirty-two residents in affiliated hospitals were given formal basic science courses. This instruction is in addition to the usual opportunities made available to residents in the Medical Center to participate in educational and research activities in the College of Physicians and Surgeons. The number of such residents enrolled in basic science courses has diminished in the last four years (since the termination of the W. K. Kellogg grant), partly because two of the major affiliated hospitals were stimulated to organize their own basic science departments with full-time salaried staffs.

STUDENT HEALTH SERVICE

The Student Health Service, under the faithful direction of Dr. Albert R. Lamb, Jr., continues to meet the health needs of the students and employees of the Faculty of Medicine.

During the past year there were 402 routine physical examinations on students and 259 pre-employment physical examinations on new employees. Twenty-two students were admitted to the admitting ward and thirty-two to the hospital. Routine chest X rays and routine dental examinations, including X rays, are available to the student body.

Besides providing routine health service, the Student Health Service continues to help students in other ways, such as rendering premarital examinations, completing insurance forms, and offering other similar services.

RECRUITMENT OF MEDICAL STUDENTS

In view of the importance to the nation of maintaining an adequate supply of well-qualified physicians, it is worthy of note that there is a national decline in the number of applicants for admission to medical schools and, at the same time, an increase in the number of available places in the medical schools. New schools and the increased size of many entering classes are responsible for the latter. From 1948–1949 to 1952–1953 there has been an increase of more than nine hundred places in entering classes. The total enrollment in medical schools in 1953 was about five thousand more than in 1948–1949.

At the peak of applications in 1949 (24,434) there were 3.47 applicants for every available place. Last year the number was slightly under 2.00, indicating that 50 percent of all who applied were accepted.

The trend of admitting more students from a smaller number of

candidates points up the dangers of deteriorating standards, especially in the state-supported schools where admissions are restricted to the applicants of the state. Some of these schools can find hardly enough students to fill their "enlarged" classes. Obviously, they have lowered standards in order to get as many students as they can.

According to a recent study, 40 percent of the students accepted in 1950 for medical school had A averages in college. It is significant that, using the same sampling, the percentage of A students in 1952 had dropped to 18, whereas C students increased from 9.11 percent in 1950 to 14.5 percent in 1952. Last year one medical school was reported to have accepted a class in which 94 percent of the students had average college grades of C.

These data are of special significance in view of the efforts of industry, governmental and voluntary agencies, and other professions to stimulate recruitment of high-quality personnel from a limited supply of such individuals. There are several reasons why medicine is in a rather unfavorable competitive situation at this time. Efforts should be made in the long-term public interest to insure an adequate supply of competent doctors and medical scientists for the national needs of the future.

Associate Dean Severinghaus, chairman of the Committee on Admissions, reports that the admission statistics of this school have changed very little as the result of the fall-off of applications. This is shown by the fact that students are selected from essentially the same number of colleges each year (in excess of 250) and that the geographic distribution by states of the student body remains relatively constant (from twenty-five to thirty states are represented in each entering class). Selections continue to be based on the over-all qualifications of the individual for a successful career in medicine, regardless of any other factors.

The academic standings in the colleges of our accepted students also have varied little. Although we do not select our students on the basis of the academic record alone, as some schools do, there has been little deviation from the pattern over the last ten years; this runs about 25 to 30 percent, A; 65 to 70 percent, B; and 5 percent, C. Even those accepted with C records in college usually have no academic difficulty in medical school because of the care in weighing the individual situation with each such candidate. An analysis is now being made of the records of students who have failed or done poorly in their work here. As could be

predicted, early indications are that many of these will be among the students who had received A grades in college.

The faculty is convinced of the soundness of its admission policies. These base selection upon a total evaluation of the applicant, whose academic record in college and preparatory school provides only a part of the admission data available about him.

FOREIGN MEDICAL GRADUATES

In the Dean's report of last year, special attention was called to the situation in regard to the large numbers of graduates of foreign medical schools who are entering the country. This was one of the major topics of discussion at the Annual Congress on Medical Education and Hospitals of the American Medical Association and the Federation of State Medical Boards of the United States held in midwinter. The whole problem was approached at that congress from a national point of view and with a sympathetic attitude by all of the organizations dealing with this complicated problem.

In April, representatives of nineteen national agencies, including those of the federal government as well as the licensing bodies, created a Joint Commission for the Evaluation of Foreign Medical Graduates. This new organization has adopted a program focused primarily on the determination of the competence of individuals and will, if successful, make a highly important contribution to the protection of reasonably adequate standards of medical practice throughout the country.

THE BICENTENNIAL CELEBRATION

The section on "Meeting the Health Needs of the Nation" of Conference IV of the Bicentennial of the University in June, 1954, was a gathering of representative authorities from the fields of medicine, public health, nursing, dentistry, economics, prepayment insurance, medical education, and hospital administration, and still others from labor unions, the life insurance industry, and the Department of Defense—all of whom were directly concerned with one or more of the aspects of this all-important national problem. The general objective was to assess the social aspects of the health services with particular reference to the social responsibilities for the welfare of the individual. The emphasis was upon opportunities for a multiprofessional approach to a wide variety

of topics which have an impact upon the problems confronting the health professions and the public.

THE NATIONAL HEALTH PROBLEM

The maintenance and improvement of the physical and mental health of the people are the primary responsibilities of any nation. Health ranks with other major features of the national economy, comparable in importance to food supply, housing, employment, education, industrial and agricultural production, and social security, with each of which it has direct relationships. It is well known that knowledge regarding the diagnosis, treatment, and prevention of disease and disability and the maintenance of normal health is far in advance of its application to the needs of individuals, families, and the community. There is a great lag between what we know and what is applied. However, the American people are convinced of the value of proper health services and are determined that in some way their benefits shall be made available to all. The public is demanding such benefits often without willingness to accept the necessary responsibilities or obligations. The demands frequently are not for reasonable or basic requirements but for maximum benefits without financial or personnel provisions for meeting them.

Everyone today is aware of the broad public responsibility of medicine, which must be recognized as a social as well as a biological science requiring technical knowledge and skills, facilities, organization, adequate financing, proper public relations, and all of the implications of a comprehensive community service.

Many of the factors influencing the provisions for adequate health are recognized. To illustrate only a few, mention may be made of the industrialization of our country; the high rate of urbanization; new methods of communication and transportation; the increasing age of the population; the conduct of government largely by pressure groups; laboratory and therapeutic services for every population area; the recognition of specialization within the profession and the importance of coordinating skills and talents of specialists into forms of group practice for those patients needing multilateral attention; the rapidly developing trends toward prepayment insurance for hospital, medical, and other health services; the essential contributions of preventive medicine by federal, state, and voluntary agencies and the professional groups; and

the financial problems of all of these activities in an inflationary economy. Yet the needs in matters of health and disability are still individual, personal, and intensely human.

It is recognized that the level of any health service cannot rise above the competence of those who participate in it. Hence, the recruitment and education of professional personnel are essential. Such preparation must be for the needs of the future, not those of the past or even of the present. At the risk of oversimplification, it would seem obvious that the unit of any health service is the individual and his family.

The keystone in the arch of any adequate program of health services was, and still is, the family physician. He is the central figure in the constellation of professional talents and skills required in the light of present-day knowledge for the intelligent and proper care of the family. The crux of the matter is that the physician as a specialist must retain his ancient value to people as a physician and humanist and, when necessary, to utilize the aid of nurses, nurse's aides, assistants, social workers, psychologists, psychiatric social workers, and sociologists who are to some extent supplanting the personal physician, just as in the past the physician supplanted the priest. The early education in the humanities and the native interests in human problems of those who would be physicians can never be replaced, however, by any amount of studies in social science, psychology, or economics.

"Adequacy" cannot be a fixed idea because it will vary from time to time and from situation to situation. It cannot be a purely theoretical consideration because as one goal is reached new targets are developed. The objective should be a reasonable degree of accomplishment and the availability of the necessary facilities and personnel for every family and community.

One of the major considerations in the evolution of the concept of health services is the transition from the established methods of individual, solo private practice of medicine on a fee-for-service basis into a modernized plan consistent with the recent developments in specialization within the profession, the requirements for extensive resources for the modern practice of medicine, and the necessity of distributing the high costs of health services through various prepayment and insurance plans. These developments in themselves introduce new problems arising from the necessity by an insurance carrier to fix premium rates on

a reasonably stable basis of expenditures for professional fees. The insurance coverage for hospitals, as an example, is having a pronounced effect on the character and classification of patients in those institutions, with a marked shift from ward services to private and semiprivate accommodations—a factor of great importance in the planning of new institutions.

It is important to retain the good and strong features of proven methods of practice. To them must be added social, economic, political, and administrative devices that will extend and make available to the entire population the latest methods of diagnosis, treatment, and prevention. This can be accomplished only in competition with other demands upon the disposable income of families and through various methods for voluntary savings, with particular reference to persons of moderate means who today are so largely living on installment buying. They are the largest purchasers of automobiles, home appliances, cosmetics, beverages, entertainment, and other features of so-called "optional consumption."

The total annual expenditures for health services in the United States are currently in excess of $10 billion per year. Charges by physicians total approximately 37 percent of this total and those for hospitals amount to $2 billion, or nearly 20 percent. Medicines cost $1.5 billion, roughly 15 percent, and are largely patent medicines and pharmaceuticals. Other medical services consume about 13 percent and dentists about $1.6 billion, or 16 percent. Although over ninety million people in this country now carry some form of hospital or medical care insurance, it has been estimated that only about 15 percent of the expenses is covered by insurance benefits. The percentage is low, of course, because many essential services are provided from other sources. The average family is spending just over $200 per year. However, approximately three and a half million families (7 percent) incur charges of $500 a year or more. It is estimated that a million families spend half their annual income, and this introduces the question of catastrophic illness to which insurance companies are now giving so much attention.

Other questions that suggest themselves are the effect of the increasing age of the population; the growing amount of chronic disease; the need of convalescent facilities and rehabilitation units; the role of the hospital, including its outpatient department; office practice and home care; the

growth of psychiatric problems in the population; the supply and recruitment of professional personnel—nurses, dentists, physical therapists, occupational therapists, technical aides, radiologists, psychiatrists, and the para-medical personnel; and the vital question of adequate financial support of professional education and service facilities.

Newer developments include the growth of group practice; prepayment medical care, with emphasis on prevention as well as therapeutic services; current discussions in the Congress of the United States on federal reinsurance for medical care programs; the distribution and availability of health personnel in local areas of the country; the problem of large numbers of graduates of foreign medical schools, which is now challenging the licensing machinery, the profession, and the hospitals of the country; the continued education of physicians, nurses, dentists, and others in practice; the growth of health services, fringe benefits, and other provisions by labor unions, frequently associated with pension contracts and the necessity of cooperation by the medical professions in the control of unnecessary diagnostic examinations and the excessive use of hospital facilities and expensive medications.

The increase in support of medical research is a phenomenon of recent years. In 1952 the total expenditure for medical research was $173 million, of which 42 percent was contributed by the federal government. The United States Public Health Service spent $42 million. The amount made available for medical research, substantial as it is, constitutes only 5 percent of the nation's expenditure for scientific research and development. Private philanthropy has contributed $25 million a year for research, or 14 percent of the total, which is double the amount from that source compared with 1941.

It is clear that there is a need of freedom for experimentation in methods and distribution of proper medical and health services. If obstacles to sound experimentation in the organization and utilization of health services could be removed, great improvement and economy of effort and money would result from such endeavors. The distribution of physicians and other health personnel is largely related to the availability of facilities and financial support in local communities.

An estimate of the additional costs to meet the health needs, while high, obviously would be an investment which would return large dividends in the reduction of absenteeism in industry, incapacity, and pre-

mature death and dependency. This can be brought about with great benefit to the nation through proper education of the community to use health resources far more effectively than they are being used today.

The most economical and satisfactory health services are those of the highest quality and the quality of services is not determined by the methods of payment. There are many advantages for large segments of the population through group practice and prepayment and preventive medical services on a comprehensive family basis. Recognition of basic principles and objectives will encourage constructive, forward-looking policies in health matters, tailored to local needs and conditions. In spite of sharp differences of opinion and the defense of existing economic practices by some medical and other organizations, there is much common ground on which constructive programs can be built.

THE TWENTY-FIFTH ANNIVERSARY OF THE COLUMBIA-PRESBYTERIAN MEDICAL CENTER

One of the most important events of the academic year was the celebration of the twenty-fifth anniversary of the Medical Center on October 12 and 13.

The Medical Center was conceived and built to integrate functionally and geographically the highest type of medical education, research, and patient care. The feature that distinguishes it from the usual hospital and community medical service is the emphasis upon the education of physicians, nurses, dentists, public health officers, scientists, teachers, and other professional personnel in the undergraduate, graduate, and postgraduate fields and upon the advancement of knowledge in the medical sciences and its application in the clinical and social aspects of medicine.

The affiliation of Columbia University with the Presbyterian Hospital and other institutions at the Medical Center, when it was put into effect twenty-five years ago, represented a fresh concept which attracted the generous support of farsighted benefactors. It paved the way for the signal advances which the Medical Center has made in the training of leaders of medical thought, in the techniques and policies of medical education, in the store of knowledge of human biology, and in services to the community and the nation.

The Medical Center is much more than the sum total of its individual units. The success of its program has depended upon, and in the future

will be determined primarily by, the ideas and ideals which it represents and upon the men and the facilities than can be provided for them to attain these objectives of public service, education, and research. It has endeavored to create an environment in which medicine of the highest scientific standards can be attained. The emphasis has been upon men and not upon bricks and mortar. The ideal of the Medical Center is to give further impetus to the development of medical knowledge, which during the last fifty years has been more noteworthy than in the previous four thousand. Medicine today is on the threshold of unprecedented developments.

It may be well to recall briefly the background and purposes of the Medical Center. When Mr. Edward S. Harkness first became interested in a possible affiliation of the College of Physicians and Surgeons with Presbyterian Hospital, he wrote in 1910: "The scientific development of medicine has especially interested me recently.—The medical school constantly supplies the physicians and surgeons of the future who in their early training must have every facility for practical experience and application, which they can only obtain at a hospital where they are taught by the practicing physicians and scientific men."

At that time Mr. Harkness stated in part the following understanding and conditions:

1. That the Hospital shall admit to the wards students of the medical school to the extent and in the manner permitted by the most approved practice.
2. That the educational institution concerned may make nominations to all positions on the Hospital staff, medical, surgical and special.
3. That the persons occupying for the time being the ranking or foremost professorships in medicine and surgery in the educational institution concerned shall always be nominated to appropriate positions on the staff of the Hospital.

After adoption of the affiliation plan in 1911, the faculty of the University outlined further the aims of the school-hospital program:

I. The objects of the School of Medicine of Columbia University shall be:
   a. To train men and women to be physicians of the highest type and to develop leaders of medical thought;
   b. To test and increase our knowledge of the art and science of medicine and to foster research;
   c. To apply that knowledge to the prevention, cure and alleviation of human ills.

II. In planning such a school we must differentiate between that portion of the entire scheme which is essential for the development of a medical school designed to accommodate a definite number of students for the degree of M.D., and other portions not essential to this primary purpose but necessary to complete the organization to its fullest possibilities.

The decision of the University and the Hospital to create a joint medical center devoted to medical education and research enlisted the financial assistance of the Rockefeller Foundation, the Carnegie Corporation, and the General Education Board, and thereby construction of the medical school was made possible.

At the ground-breaking of the Medical Center in 1925 President Nicholas Murray Butler said: "The first turning of the soil on this spot is the beginning of the fulfillment of a prophecy that was made at the annual commencement of King's College held one hundred and fifty-six years ago. It is the beginning of the accomplishment of a dream that has been in the minds of many of us for a generation past. It signifies that at last the two aspects of medicine—the scientific and the philanthropic—are to be united in bonds that cannot be broken, as part of a new and vital union of organization, of purpose, and of public service. It means that a fully equipped university shall hereafter have at the service of its teachers in medicine an ample and thoroughly modern series of laboratories and clinics. It means that a noble hospital with a long record of public service behind it, from this day forth commands the best, the very best, that science, academic experience and personal devotion can give to ground the service of that hospital on the unshakable foundation of modern science in all its many-sided phases."

On the same occasion, Mr. Dean Sage, president of the Board of Managers of Presbyterian Hospital, said: "Many years ago two partners, Columbia University and the Presbyterian Hospital, conceived a vision. That vision was born of a wish to accomplish for the City of New York a broad union of the forces of Medical Practice, Education and Research, to the end that man might reap the benefit."

At the dedication of the Medical Center on October 12, 1928, President Butler again remarked: "On the very day which marks the anniversary of the discovery of the new world by Christopher Columbus, it is becoming that Columbia University, a vigorous and eager child of that

new world and its ardent spokesman, should mark with distinction and large acclaim the effective and noble completion of a great project of highest scientific importance and public interest, originally brought forward at the Commencement of King's College on May 16, 1769 by Dr. Samuel Bard, Professor of the Practice of Medicine in that early and foundling institution."

The second generation applauds the wisdom, foresight, and courage of the leaders of the preceding generation which made possible this pioneering endeavor which has meant so much to the people of the city of New York, to medical education, and to the advancement in medical science and public health. The principles laid down in the original affiliation agreement of 1911 between the University and the Hospital, and subsequently reaffirmed in the agreement of 1921 under which the Medical Center continues to operate, emphasized the importance of the educational and research activities of the Center which, in turn, have guaranteed the maintenance of the highest quality of patient care in the hospitals and clinics of the joint enterprise.

The original agreement of 1911, and its successor of 1921, provided that the University should have the responsibility of nominating all the professional personnel on the hospital staff and that students should be admitted to its wards and facilities in order that instruction of future physicians, dentists, nurses, and other health personnel might be provided. This could be fully accomplished only through a complete geographic integration of the laboratory, research, clinic, and hospital facilities, in order that the newer scientific developments of the laboratories and research units could immediately be placed at the disposal of those studying the mechanisms and physiologic problems of illness, injury, and disability in patients, all under the control and management of competent clinicians.

The extent to which the program has been realized can bring only deep satisfaction to those who made the Center possible. There are no indications or serious suggestions for changes in the policies adopted at the very beginning. The foundations have been laid securely for one of the great contributions to medicine in the future. The Medical Center must anticipate the health requirements of the next generation in order to continue its primary purpose of professional education, the advancement

of knowledge, and service to the public. These require a high order of imagination and foresight, sound leadership, and courage in the formulation of educational and hospital planning.

The faculty and staff of the Medical Center have contributed materially to the sound evolution of medical education through the continued emphasis upon scientific medicine, which must remain the basis of medical practice and care in the future, to which is added the interpretation of social, psychologic, emotional, and economic factors in the care, treatment, and study of patients. The teaching programs of the University in the undergraduate, graduate, and postgraduate training of physicians have never lost sight of the patient as the unit of medical care. Contributions to these broad concepts include the creation of the social service department, perhaps the first of its kind in this country. The follow-up clinics and the unit history system were established in recognition of the "longitudinal" study of patients as distinguished from the purely cross-section method of observation, so common in teaching clinics elsewhere. The newer methods of case studies of individual patients have given fresh meaning to the term "preventive medicine" because they are applicable to every type of illness. They bring significance to conditions of employment, the home environment, family problems, conditions of housing, the economic factors, and emotional impacts which so often determine aspects of sickness and disability.

The study of stress as a factor in health and disease and the development of the "personality panel" indicate the early recognition by the faculty of these important concepts. The introduction of psychiatric teaching on all of the wards in the hospitals and in student clerkships points clearly to an endeavor to understand the total individual and the relationships between psychologic and emotional factors and their influence on bodily function.

Seven years ago the group clinic was established for the fourth year of teaching. After the first year, the medical course in effect operates throughout twelve months of the calendar year. The concept of group practice has made it possible to bring the highest type of integrated instruction to bear upon the actual care of patients. The Medical Center has taken active leadership in the study of chronic diseases both at the Center and through its affiliation with the Goldwater Memorial Hospital. The opportunities for experience in the highest type of rural practice at

the Mary Imogene Bassett Hospital in Cooperstown and the instruction in industrial medicine, nursing procedures, and public health are other illustrations of the broad base of the teaching program.

The philosophy in the educational program has been shifted from the earlier ideas of teaching by the faculty to learning by the student. This defines the medical course itself only as the foundation for the necessary continuous self-education of the successful physician throughout his professional career. The concept regards the four-year medical course as a unit, rather than as a series of isolated subjects, by integrating the basic sciences and clinical disciplines through correlation and combined clinics and other instructional devices. The program emphasizes instruction in group and rural medical practice, leadership in the fields of graduate and postgraduate medical education, new developments in administrative medicine, the role of the basic medical sciences in sound clinical teaching and practice, the importance of the chronic diseases, preventive medicine, psychiatry, psychosomatic medicine, the handling of emergencies, the development of the full-time system of university teaching and research, and concentration at the Medical Center of a large proportion of the staff on the geographic full-time system, as illustrations.

Using the Medical Center as a base of operation the University has worked out numerous affiliations with other hospitals, health departments, and industry; prepayment insurance plans; home care services; and a wide variety of community activities designed to strengthen the health and professional services for the entire New York area. It has made noteworthy contributions in the continued education of physicians and in the residency training in a number of affiliated hospitals, and has constantly striven toward maintenance of high standards of medical practice in the country.

The impressive contributions to medical science can be well illustrated by a few examples, such as those on the pituitary gland and its hormonal interrelations, the pioneer studies of isotopes in intermediary metabolism of a variety of physiologic substances, the discovery of the structural formula of vitamin B_1, the development of quantitative immunochemistry, experimental studies of muscular dystrophies, the chemistry of blood group substances and the role of blood volume in shock, the portacaval shunt in the treatment of cirrhosis of the liver and other advances in cardiac and blood vessel surgery, successful resection of the

head of the pancreas for cancer, discovery of bacitracin, studies in the diagnosis and treatment of adrenal tumors, iodine uptake in thyroid carcinoma, definition of electrolyte disturbances in Addison's disease, the role of streptococcal infection in scarlet fever and rheumatic fever, the dietary treatment of cirrhosis of the liver, the physiology of heart disorders and the introduction of cardiac catheterization, demonstration of viral etiology of the common cold, first clinical use of penicillin in the United States, the cephalin flocculation reaction, discovery of acid phosphatase in the blood and its use in the diagnosis of cancer of the prostate, the first clinical use of vitamin B_{12}, introduction of helium-oxygen mixtures for obstructed breathing, serologic methods for the diagnosis of rheumatoid arthritis, chemical recognition of pheochromocytoma and the role of nor-epinephrine, contributions in electrophoresis, the chemistry of the cell nucleus, the isolation of the milk factor in breast cancer in mice, pioneer studies of circulation with radioactive sodium, the measurement of radiation dosages, research in the understanding and control of bleeding, advances in anesthesiology, the control of influenza meningitis, and the character and behavior of bacterial genes.

Fully aware of the many and diverse responsibilities which revolve about the health services in the community and the nation which the several professions must carry, the University can, in the long run, render its most important and broadest public service through the maintenance of a high level of professional education in the health sciences. It can and should carry its share of the obligation for hospital services, the continued education of practitioners, and the preparation of specialists. Its greatest contribution, however, is to educate men and women to meet these responsibilities rather than to assume direct management of community service, except those necessary to discharge its function in society.

The Center reflects the changing responsibilities of medicine in a progressive society. It has mirrored the development of medicine from an empirical art to the application of scientific methods to the diagnosis, treatment, and prevention of sickness and disability, without losing the deep humanistic values which have set medicine apart from most other callings.

It is with high courage and confidence that the Medical Center accepts the challenge of the future and looks forward to the contributions which it can be expected to make during the period ahead, in the full realization

that one of the greatest assets of any nation is the health of its people. In the final analysis the teaching institutions are the guardians of the health of the nation since the quality of medical education and research ultimately determines the standards of medical care. To the improvement and betterment of that great national asset, the Medical Center in its twenty-fifth anniversary year rededicates itself with vigor and confidence.

DEPARTMENT OF ANATOMY

Professor Samuel R. Detwiler, Executive Officer

The department wishes to express its gratitude to the Lederle Medical Faculty Awards Committee for their action in granting an award to Dr. Melvin L. Moss of this department, for a period of two years. Dr. Moss's appointment as instructor will strengthen the teaching of the course in gross anatomy and will reactivate the department's interest in the field of physical anthropology.

Dr. Malcolm B. Carpenter, the holder of a John and Mary R. Markle Foundation Scholarship, has contributed materially to both the teaching and research activities in the field of neuroanatomy and neurophysiology within the department. Dr. W. Gregory Cooper has been appointed instructor in anatomy.

There have been no fundamental changes in the courses of instruction to the medical and dental students. Various members of the department contributed materially to basic instruction of the nurses, as well as to the instruction in anatomy of students of physical and occupational therapy. The course in clinical anatomy to residents in orthopedic surgery under the direction of Professor Emanuel B. Kaplan continues to be a popular and successful enterprise within the department. Various members of the department have given freely and unstintingly of their time to contribute to the success of this course. Professor Kaplan has conducted also a special, advanced course in the anatomy and surgery of the hand. He gave a special presentation of advanced surgical anatomy of the hand for traveling fellows in orthopedic surgery from Great Britain. This was sponsored by the American Orthopaedic Association. Thirteen regular basic science courses for residents of affiliated hospitals have been offered in the department, with a total registration of 100.

Despite a heavy teaching load, the members of the anatomy staff have been active in diverse fields of research.

Professor Margaret R. Murray, who is in charge of the laboratory for cell physiology, reports the scientific activities of her laboratory to the Department of Surgery. We are pleased, however, to record her election as president of the Tissue Culture Association in April, 1954, and also her election as the

association's official delegate to the Eighth International Congress of the Society for Cell Biology, to be held in Leiden in September, 1954. Professor Murray was awarded a citation by Goucher College on the occasion of the dedication of the Hoffberger science building in April, 1954.

Professor Dorothy D. Johnson was granted a leave of absence from March 1 to June 30, 1954.

Professor Wilfred M. Copenhaver is pursuing histochemical studies on cardiac tissue at different stages of development with particular reference to differences between typical cardiac muscle fibers and those of the specialized conduction system. Further studies are in progress on the effects of propylthiouracil on amphibian larvae, with reference to cartilage tumors and thyroid tumors which develop when the animals are subjected to prolonged treatment.

Professor George K. Smelser with his assistant, Mrs. Darren Chen, have completed an investigation of the physiological changes in the cornea induced by contact lenses. This study has shown that conventional contact lenses produce a corneal haze and an increase in corneal thickness in guinea pigs. This is accompanied by an accumulation of water in the corneal stroma and also of lactic acid. The accumulation of lactic acid indicates that the metabolism of the cornea is abnormal and that a state of relative anoxia exists. The experiments established more firmly that the metabolism of the cornea is involved in the maintenance of its thickness and transparency and that the undesirable effects of contact lenses are due to their interference with the metabolism of the cornea. Studies are in process on the comparative structure, chemistry, and physiology of the corneas of mammals and fish.

Professor Herbert Elftman has published the results of his investigations on the structure of the Golgi body, and has continued his cytochemical research on phospholipid constituents of the cell. Methods have been developed for a study of these constituents without disrupting the normal structure of the cell, thus providing information not obtainable from homogenates or extracts. This project is supported by a grant from the National Science Foundation.

Professor Edmund Applebaum is working in collaboration with Professor Carl R. Oman of the School of Dental and Oral Surgery. Cavities have been cut in the teeth of experimental animals by means of a new ultrasonic device. Several teeth of a chimpanzee and a dog are being prepared for histologic study of the effects of ultrasonic vibration on the dental pulps of these animals.

Professor Frederic J. Agate is completing a study of the chemical and histological changes in the adrenal of the nephrotic hamster. Work is being continued on the nephrotic syndrome in the hamster with particular emphasis on the factors responsible for edema in this form. This investigation is supported by the Babies Hospital Nephrosis Fund. With the assistance of Mr. Frederick K. Curtis, studies are being carried out on endocrine factors in-

volved in defence against low environmental temperatures, and also on the effects of low temperatures upon hypophysectomized rats. In collaboration with Dr. William Antopol of Beth Israel Hospital, a study has been completed on the induction of tumors with 3–4 benzpyrene in hypophysectomized rats.

Professor Charles R. Noback is actively engaged in studies on the degeneration of nerve fibers in the central and peripheral nervous systems, and investigations are being carried out on the use of the skeleton as an index for determining the maturation of developing man.

Professor Charles A. Ely has completed a study of the influence of normal and antigonadotrophic rabbit sera on the early stages of the development of estrogen-induced interstitial cell tumors in A-strain mice. Similar studies are to be extended to later stages in interstitial cell tumor formation and to ovarian tumors arising after implantation of ovaries to the spleen of castrate animals. In addition, the effect of antigonadotrophic sera on the growth of a transplantable interstitial cell tumor and a granulosa cell tumor of the BALB strain of mice is under investigation. This work has been supported by contributions from the Damon Runyon Memorial Fund and the Anna Fuller Fund.

Professor William M. Rogers is engaged in an analysis of heart sounds in surgical cases. This work is being done in cooperation with Professor Ralph A. Deterling, Jr., of the Department of Surgery. Heart sounds and electrocardiographic findings are recorded on a dual channel oscilloscope and photographed with a kymograph camera. Records of both phenomena are made on magnetic tape for frequency analysis. The operative findings are being correlated with pre- and postoperative records. The purpose is to develop diagnostic criteria. The equipment has been supplied by the National Institute of Health in a joint grant to the Departments of Anesthesiology and Surgery. The equipment is being utilized also for electromyographic studies of muscles in patients with muscle atrophy resulting from poliomyelitis.

Professor Harry H. Shapiro has completed a new text on maxillofacial anatomy which will be published shortly by J. B. Lippincott Company. With Dr. Sidney L. Horowitz of the School of Dental and Oral Surgery, studies have been completed on alveolar bone changes following alterations of masticatory function in the rat, and also on skull and jaw modifications following removal of the masseter muscle in the rat.

Professor Kaplan has continued his studies on surgical approach to the knee joint, based on functional and comparative anatomical studies of the chimpanzee, gorilla, rhesus monkey, and the bear. Further studies are being carried out on the functional characteristics of the hand and foot in relation to surgical approaches.

Dr. Malcolm B. Carpenter is engaged in investigations on the anatomical and physiological effects of localized lesions of the red nucleus, the brachium conjunctiva and the deep cerebellar nuclei in the rhesus monkey. The data

indicate that animals with lesions of the rostral part of the red nucleus exhibit hypopkinesia without other detectable neurologic deficits. Lesions of the brachium conjunctiva and the deep cerebellar nuclei are associated with varying types of tremor, ataxia, and dysmetria, and in some cases with transitory disturbances of equilibrium. The findings suggest that the red nucleus probably plays a role in positive motor function similar to that of the globus pallidus. These other studies should provide data regarding the termination and function of the fibers of the red nucleus. Studies are also being carried out to determine the physiological effect of destruction of the red nucleus upon choreoid hyperkinesia resulting from localized lesions of the subthalamic nucleus.

Dr. Christian A. Hovde has been actively engaged in studies dealing with electrically demonstrable connections of the putamen and the globus pallidus. These investigations have been supported by the United States Public Health Service, National Advisory Neurological Disease and Blindness Council. In cooperation with the Department of Neurology and utilizing the research facilities of the Rockland State Hospital, cooperative studies with Professor Agate and Drs. James B. Campbell and James Reilly are being carried out on the biochemical, histochemical, and anatomical changes resulting from the ablation of the caudate nuclei in cats. It is hoped that the results, along with electrophysiologic data previously obtained by Dr. Hovde, will aid in an understanding of the neuronic connections of the striatum and its role in normal function.

Dr. Moss is carrying on his investigations on the human skull components. These studies involve the growth and differentiation of the calvarial bones and their sutures in normal and heterotopic sites. In cooperation with the School of Dental and Oral Surgery a study is being made of the growth of the human skull base, and the experimental production of hydrocephalus. In collaboration with Professor Charles A. Noback the fetal growth of the human skull continues to be investigated.

Dr. Cooper, newly appointed instructor in anatomy, who has been working under the direction of Professor Copenhaver, has completed a histochemical study of the succinic dehydrogenase activity in the prenatal and postnatal rat heart.

Professor Adolph Elwyn has carried out his usual schedule of neuroanatomical teaching to medical and dental students. He also conducted a symposium on the autonomic nervous system for graduate nurses.

Professor Samuel R. Detwiler and his collaborator, Dr. Howard Holtzer of the Department of Anatomy, University of Pennsylvania, have completed an experimental study of the inductive action of the embryonic spinal cord upon the formation and structuring of the vertebral column. Professor Detwiler and his assistant, Mrs. Rhoda Van Dyke, have also completed experimental studies dealing with the induction of supernumerary retinas in the eyes of urodele amphibians. An experimental study is being made of the

embryonic origin of the ventrolateral trunk musculature. Professor Detwiler was elected president of the American Association of Anatomists for a two-year period.

DEPARTMENT OF ANESTHESIOLOGY

Professor Emanuel M. Papper, Executive Officer

During the academic year the teaching of undergraduate medical students has not changed appreciably.

The graduate training of the resident in anesthesiology continues to be the strongest educational activity of the department. It has been changed during this past year by including special seminars for the junior assistant residents in the early phases of their training and by more direct and intensive "bedside" teaching in the operating room. More instruction in the postoperative period and its problems has also been provided. The pattern of seminars and staff conferences for the training of residents has proved eminently satisfactory, to the point where these meetings have been emulated in several other institutions.

Although the physical space available for research has become increasingly cramped, the studies carried on in the department have continued at a high level of productivity. Professor Duncan A. Holaday conducted further studies of the acidosis associated with anesthesia. He is interested in the response of tissues to the metabolic acidosis which appears to be caused by respiratory acidosis resulting from the retention of carbon dioxide. He demonstrated that the acid-base balance of the tissues of the dog (skeletal and heart muscle) behave in a manner similar to that of the blood. The results suggest that the organic acids which are manufactured within cells during respiratory acidosis are buffered in part by a shift of alkali from the extracellular fluid into the cells. With Dr. Herbert Rackow, Professor Holaday is studying the pattern and nature of the accumulation of organic acids within the cells during anesthesia and its associated physiological disturbances.

With Dr. Edward Williams of the Department of Medicine, Professor Holaday studied the influence of the "cough machine" on respiratory gases during recovery from general anesthesia. They found, in eight patients, that the "cough machine" is capable of removing secretions not previously removed by conventional methods of suction from the respiratory tract and that ventilation can be improved slightly to elevate the pH of the arterial blood as much as 0.1 of a pH unit. However, this device does not alter the general level of ventilation of the patient nor does it have a lasting effect in overcoming respiratory acidosis in the immediate postoperative period.

Professor Holaday developed a micromanometric method of analyzing whole blood samples containing volatile anesthetic agents. The method for the combined determination of carbon dioxide and oxygen in blood samples

taken from patients breathing anesthetic gases is accurate for all clinical purposes and for most research purposes. With Dr. Jacob S. Israel, Professor Holaday studied the compliance and airway resistance in anesthetized patients by the analysis of single inspiratory curves obtained during controlled respiration. They demonstrated that compliance and resistance are sufficiently altered by general anesthesia to require greater pressures to effect the same tidal exchange that existed prior to induction. Curare restores this situation toward normal. Further studies are in progress to explore the nature of respiratory compliance and resistance in various diseased states, intrapleural operations, and with different anesthetic agents.

Professor Holaday and Dr. Lester C. Mark modified the method for cardiac output measurement developed by Dr. Samuel R. Powers of the Department of Surgery. This method is designed to monitor the effects of different patterns of controlled respiration during anesthesia upon the circulation.

Dr. M. Jack Frumin devoted much time to the development of an automatic respirator which is of theoretical and practical significance. This method, with its safeguards, appears to be physiologically sound, uses agents that are nonexplosive, and provides muscular relaxation sufficient and adequate for the performance of surgical procedures. Dr. Frumin chose nitrous oxide and oxygen for the achievement of anesthesia, succinylcholine for muscular relaxation, and developed a respirator which is automatically governed by the concentration of carbon dioxide in the alveolar air. The full adaptation of this point of view toward general anesthesia also involves the automatic control of neuromuscular blockade and the semi-automatic monitoring of the vital signs of the circulation. Although basic information is available on these matters, they have not as yet been developed to the point where they are of practical use. Essentially, the automatic respirator functions as an electrochemical respiratory center and performs the work of breathing. Thus far, these studies have consisted of the design and development of the instrument described, its utilization in patients undergoing clinical surgery, and the measurement of blood gases and arterial pH in a few patients.

Dr. Mark continued the long-standing collaboration of this department in the study of barbiturates with Dr. Bernard B. Brodie of the National Heart Institute and Dr. John J. Burns of the Goldwater Memorial Hospital. He and his associates studied a new barbiturate, medomin, in an effort to determine whether the introduction of a seven-membered cycloheptenyl ring would hasten the metabolic transformation of oxygen barbiturates. Experiments in man and animals demonstrated that this compound behaved pharmacologically and clinically like secobarbital and pentobarbital. This chemical device for the modification of the duration of action of the barbiturates was therefore abandoned. Dr. Mark and Dr. Shih-hsun Ngai also conducted studies on the penetration of thiopental into the brain of the dog. Penetration into several parts of the brain is very rapid, suggesting that there is no blood

carrier for the drug. It was also demonstrated that thiopental could be used for the measurement of cerebral blood flow since its intracerebral penetration depends largely upon the circulation of the blood. Similar experiments are now in progress with pentobarbital. Further investigation is planned to examine the pattern of distribution of these barbiturates into the extracellular water of the central nervous system.

Dr. Bernard R. Fink continued his work on "diffusion anoxia." He demonstrated that there is a dilution of oxygen by anesthetic gases in the alveolar air during the early phases of recovery from gas anesthesia. Dr. Fink showed that this phenomenon may lead to a short but significant period of anoxia with all its implications. Dr. Fink continued his development of the nonrebreathing valve, a modification of the Leigh valve. He measured the resistance to gas flow at a variety of flow rates through the valve in collaboration with Dr. Louis R. Orkin of New York University. The valve developed by Dr. Fink is eminently satisfactory for clinical application. Dr. Fink also conducted a radiographic study designed to simplify techniques of endotracheal intubation. The result was a better understanding of the anatomical limitations involved in the method.

Dr. Eleanor C. Nelson continued her investigations of the physiology and clinical application of hypothermia. This work is a collaborative study with Professor Ralph A. Deterling, Jr., and Dr. Shivraji Bhonslay of the Department of Surgery, and for a period of time, with Professor William S. Howland, formerly of the Department of Anesthesiology. Hypotension and bradycardia occur and can be correlated with the reduction of body temperature. Electrocardiographic changes are quite variable. The cardiac output measured by the direct Fick method is reduced, paralleling the reduction in oxygen consumption. Since there is some doubt of the validity of the measurement of cardiac output by this method during marked reductions of body temperature, the direct flow of blood in the aorta will be measured with a rotameter. The changes in acid-base balance which have been observed appear to be those related to the change in the physical characteristics of the blood at reduced body temperatures, or to extrinsic factors such as hypoventilation. Dr. Robert Holliday of the Department of Surgery and Dr. Nelson demonstrated that there was a marked increase in blood viscosity but no change of importance in the clotting time or the pattern of clotting during hypothermia. Dr. Nelson's investigations with her associates have, thus far, not elucidated the mechanism of ventricular fibrillation which may occur at temperatures ranging between 23° and 28° C. Hypothermia has been applied clinically in patients subjected to operations upon the heart. There is not yet enough experience to determine its ultimate utility for these patients.

Professor Virginia Apgar continued her studies of ventilation in the newborn infant. These have been conducted in collaboration with Professor Holaday, and with Professor Richard Day and Dr. William A. Silverman of the Department of Pediatrics. These studies were designed to gain in-

formation on the nature of positive pressure which can be utilized efficiently and safely for the resuscitation of the full-term and premature newborn.

Dr. Johannes Bartels has been studying the problems associated with induced hypotension during anesthesia for the establishment of a relatively bloodless surgical field.

Dr. Ngai continued his studies of the respiratory center in collaboration with Professor Shih-Chun Wang of the Department of Physiology, Professor Holaday, and Messrs. Kohn and Kaber who are students at the College of Physicians and Surgeons. These workers found, in decerebrate animals and those anesthetized with pentobarbital, that the inspiratory neurones are located in the reticular formation of the medulla approximately 2 to 3 mm. rostral to the obex, confirming the work of Woldring and Dirkin and Pitts. They also found, in disagreement with the observations of Pitts, that expiratory neurones are congregated caudal to the inspiratory center.

Since there is confusion as to the mechanism of apnea following the injection of muscle relaxants, Dr. Ngai and his associates examined the influence of succinylcholine upon the respiratory center. In doses more than adequate to produce muscle paralysis, there was no depression of the rhythmical discharge of the respiratory neurones of the medulla. Further studies are in progress to extend this work to the examination of the effect of other muscle relaxant drugs. Dr. Ngai and Professor Wang studied the mechanism of the hypotensive action of the veratrum alkaloids. Veratridine and veratramine have a direct depressant effect upon the vasomotor center, whereas the other compounds studied produced hypotension as the result of sustained stimulation of the carotid baroreceptors.

With Dr. Nelson, Dr. Ngai studied the cerebral blood flow during hypotension induced in the dog with hexamethonium compounds and d-Tubocurarine. They found that the cerebral blood flow decreased as a direct function of the decrease in arterial blood pressure.

Dr. Herbert Rackow, in collaboration with Dr. James B. Campbell of the Department of Neurological Surgery and Professor John N. Robinson of the Department of Urology, continued his studies on the autonomic innervation of the upper genitourinary system. This work was done with various sympathetic and parasympathetic blocks monitored by radiographic studies and cystometric pressures. Drs. Campbell and Rackow and Professor Robinson determined the specific nature of autonomic dysfunction in several patients by this approach. On the basis of their work, one patient was subjected to operation, and further investigations have been deferred pending the future evaluation of this patient's progress.

Dr. Rackow suggested that one or more of the organic acids of the Krebs cycle might be causally related to the metabolic acidosis that is found as the result of hypercarbia during anesthesia. He began the study of behavior of the acids of the Krebs cycle during anesthesia.

Dr. Herman Schwartz is collecting clinical data on the influence of obesity in anesthesiology. Obesity imposes technical problems upon which safe and

efficient administration of anesthesia may depend. With Dr. Ernest Salanitre, Dr. Schwartz is reviewing the anesthetic experiences in patients with myasthenia gravis. With Dr. Ngai, Dr. Schwartz completed a revision of the instruction manual for residents in anesthesiology.

Dr. Marilyn M. Kritchman engaged in a study with Drs. Harvey Corman and Edward J. Hornick on the nature of emotional problems associated with surgical operation and the administration of anesthesia. An analysis of various aspects of the emotional life of fifty patients has been made. Thus far, in studies on adult patients, few psychological and emotional disturbances have been elicited as a result of the anesthetic and surgical experience.

Members of the staff continued to hold posts of responsibility in various organizations devoted to anesthesiology, including the American Board of Anesthesiology, the Section on Anesthesiology of the American Medical Association, the American Society of Anesthesiologists, the Subcommittee on Anesthesia of the National Research Council, the New York State Society of Anesthesiologists, and the Armed Forces. Professor Papper was elected the first president of the newly founded Association of University Anesthetists. During the year the department was the host for the National Conference on Artificial Respiration sponsored by the Department of the Army.

Sufficient time has not yet elapsed to define completely the needs of the Department of Anesthesiology. However, two points have already become obvious: First, research space which two years ago seemed adequate and was generously provided by the Departments of Surgery and Physiology no longer suffices for the various projects under investigation. It is imperative to plan the establishment of laboratories devoted to research in anesthesiology. Second, undergraduate education of medical students, while comparatively satisfactory, needs improvement and enlargement.

DEPARTMENT OF BIOCHEMISTRY

Professor Hans T. Clarke, Executive Officer

The department has suffered the loss, through death on July 11, 1953, of Associate Professor Erwin Brand. The project under his direction, supported by the Office of Naval Research, has been discontinued. Another serious blow to the work of the department has been the departure of Professor Edgar G. Miller on his appointment as dean of the graduate faculties of the University. Professor Miller's association with the department extended over some forty years.

During the year the department took an active part in the organization of two symposia sponsored by the University on glutathione and the role of protein in ion transport across membranes. Both were highly successful, leading to the publication of monographs on the respective subjects.

Instruction in biochemistry has been given to the first-year medical and dental classes and to thirty-six graduate students under the Faculty of Pure

Science. Of the graduate students, twenty-two were working toward the Ph.D. degree in biochemistry, three at the elementary level and nineteen in advanced work. Of the thirteen graduate students with major interest in other departments, seven received laboratory instruction. During the year seven students completed the requirements for the Ph.D. degree.

Most members of the teaching staff, as well as all those holding academic appointments under the research program, have continued to be scientifically productive.

Professor Erwin Chargaff and his associates continued their investigations of the structure and function of nucleic acids and of nucleo-lipoproteins. Professor Chargaff's group included Dr. Charles F. Crampton, research fellow of the National Foundation for Infantile Paralysis, Dr. Marion E. Hodes, United States Public Health Service postdoctoral fellow, and Dr. Penina Spitnik of the Weizmann Institute in Israel. Professor Chargaff, in collaboration with Professor J. N. Davidson of Glasgow University, has been engaged in editing a treatise on nucleic acids.

Professor Hans T. Clarke has continued his work in association with Dr. Samuel Korman, a member of the senior medical class, in the chemical modification of proteins, and served as editor of the monograph on ion transport across membranes.

Professor Zacharias Dische has continued to study the conversion of ribose-5-phosphate into hexose-6-phosphate in human red cells and has demonstrated two alternative pathways of this conversion. In the course of this work, new color reactions have been developed which make possible the accurate estimation of pentose in presence of ketohexose and heptose and the detection of free pentose in presence of pentose-5-phosphate.

Professor Goodwin L. Foster has continued his studies of amino acids and their derivatives. He also bore the major share of the organization and operation of the laboratory course in biochemistry for medical and graduate students.

Professor Maxwell Karshan has continued his studies of the histochemistry of the gingiva in an effort to throw light on the etiology of periodontal disease, and was largely responsible for the course in biochemistry for dental students.

In the absence of Professor David Rittenberg on sabbatical leave, the members of his group have continued their investigations of the mechanism of enzyme action. Work has been continued on the mechanism of action of hydrogenase. A study of the ortho-para conversion of hydrogen and the exchange reaction between hydrogen and heavy water has elucidated the mechanism of action of this enzyme. It has been demonstrated that this enzyme combines reversibly with oxygen and is strongly inhibited by nitric oxide. On the basis of a study of hydrogen exchange during transamination a mechanism for the transaminase reaction has been proposed. The exchange of oxygen between organic acids and anhydrides has been investigated with

the aid of O^{18}. A method for the determination of the O^{18} content of carboxyl groups has been developed.

Dr. Victor Ross has been engaged in a study of the proteins of the milk of the RIII-strain mice (bearers of the mouse mammary tumor agent). An alcohol-soluble protein of low molecular weight has been prepared in electrophoretically homogeneous form and some of its properties determined. The properties of the casein of the milk of this strain of mice are now being studied.

Professor David Shemin has continued his studies on the biosynthesis of porphyrins. He has found, in collaboration with Dr. Charlotte S. Russell, the biochemical steps which lead to the formation of the pyrrole structure. Succinate and glycine combine to form hitherto unrecognized intermediates, a-amino-beta-ketoadipic acid and ∂-aminolevulinic acid, in the formation of a common precursor pyrrole. He has also found a cell-free extract capable of synthesizing heme from ∂-aminolevulinic acid and is attempting to fractionate the enzymes involved. To integrate the metabolic role of glycine in porphyrin, purine, serine, and methyl group synthesis, Professor Shemin has postulated a series of biochemical reactions which are known as the succinate-glycine cycle.

Professor David B. Sprinson and his group have continued their studies on the mechanism of synthesis of the methyl groups of choline and thymine from the beta-carbon of serine. In a study of the biosynthesis of sphingosine in nervous tissue he has also shown that carbons 3 and 2 and the nitrogen of serine are specifically utilized for carbon atoms 1 and 2 and nitrogen of the base, the remainder of the molecule being derived from acetate. He has found that ethanolamine and ribose are converted efficiently to acetate in the rat, probably by way of glycolaldehyde. Continued investigations of the synthesis of aromatic compounds by bacteria have shown that in the formation of tyrosine the carboxyl group of shikimic acid is replaced by the alanine side chain.

Professor Stephen Zamenhof, in collaboration with Professor Hattie E. Alexander of the Department of Pediatrics, has continued his studies of transforming principles of *Hemophilus influenzae* and *Neisseria meningitidis;* of the resistance of heredity determinants of mutagenic and carcinogenic agents; of the denaturation of nucleic acids; and of the chemical nature of type specific substances of *Hemophilus influenzae.*

DEPARTMENT OF DENTAL AND ORAL SURGERY

Professor Maurice J. Hickey, Executive Officer

In common with other dental schools there was a further drop in the number of qualified applicants but the demand for admission to the School of Dental and Oral Surgery continues at a high level. A total of 344 applica-

tions were received by the Admissions Committee and forty students were admitted to the first-year class. This represents a ratio of 8.6 applications for each accepted student. There were eighty-two fewer applicants for the year 1953–1954 than for the previous year when the class was selected on the basis of 10.65 applicants for each accepted student.

Applications were received from twenty states, the District of Columbia, Hawaii, Puerto Rico, and five foreign countries. Accepted students represent five states and one foreign country (China). The total undergraduate registration of 153 students represents eleven states, Hawaii, China, and the Netherlands West Indies.

DENTAL CLINIC

During the twelve-month period, from May 1, 1953, to April 30, 1954, 14,600 patients were admitted to the dental clinic. Of this number, 4,972 were new patients and 9,628 were former patients readmitted. There were 1,728 patients referred from the hospitals of the Medical Center; 603 teachers and students from Columbia University; 268 Medical Center or Columbia University personnel; and 4,423 from other sources. There were 45,875 clinic visits, an increase of 735 over the previous year. The operative dentistry clinic completed 3,242 procedures, an increase of 208. The prosthetic clinic completed 866 cases, one less than the previous year.

DIVISION OF OPERATIVE DENTISTRY

Activities continue, under the direction of Professor Carl R. Oman, in the pattern of past years, with emphasis on the effective teaching in the laboratory and in the clinic of the basic principles of operative dentistry.

In the field of research, Drs. Joseph M. Leavitt, Irving J. Naidorf, and William Miller are continuing their study of the bacteriological flora of infected pulp canals and the effects of selected medicaments upon the organisms in infected pulp canals, under the grant from E. R. Squibb and Sons. Much valuable information is being accumulated and some new bacterial strains have been discovered.

Professor Harold Sherman and Dr. Joseph E. Fiasconaro are continuing their study of the value of local anesthesia via the digital plethysmograph in collaboration with the Department of Neurology. Also, they have launched into a new study of the possible uses of the hypo-spray for dental anesthesia.

Another phase of research in operative dentistry is the study, conducted by Professors Oman and Edmund Applebaum, of the use of ultrasonic energy in the cutting of cavities in human teeth. The research consists of the development of a handpiece and suitable tools for use in such cutting, and the effects of such cutting on the tooth pulp and supporting structures. Preliminary investigations lead us to believe that this method presents a revolutionary trend in cavity preparation in that it does away with the

familiar rotary-type instruments. All indications point strongly to the probability of the elimination of bone conduction noises and vibration as experienced with the cutting with burs and stones. In addition, it seems that pain will be greatly reduced if not entirely eliminated. The experience gained from work begun on human subjects will prove interesting and valuable in further study of this process.

Drs. Leavitt and Fiasconaro have both been promoted from instructor in dentistry to assistant clinical professor of dentistry, and Dr. Steven Scrivani from assistant in dentistry to instructor in dentistry.

DIVISION OF ORAL SURGERY

The main efforts of the division, under the direction of Professor Joseph Schroff, continue to be directed toward better utilization of the available time for undergraduate teaching. The seminar method of teaching has been improved and the students are encouraged to participate in active discussion of clinical cases and lecture material. This has provided opportunity for more positive correlation of basic science teaching and clinical teaching.

Professor William J. Savoy, in collaboration with Professor George W. Hindels of the Division of Prosthetics, has performed several vitallium implants of the mandible for the purpose of supporting prosthetic restorations. Professor Schroff has continued his studies in the use of chemicals as an adjunct in the surgical removal of large odontomas. Studies are under way to determine the relationship of the foliate papillae of the tongue to pain in that area.

This division also teaches a two-year, full-time postgraduate course in oral surgery.

DIVISION OF ORTHODONTICS

This division, under the direction of Professor Arthur C. Totten, is providing a leading example of the postgraduate teaching or orthodontics. The curriculum has been revised and strengthened for better teaching. It would be to the advantage of the division if we had a competent physical anthropologist for child study, and we should also have a crippled children's clinic in order to take adequate care of the children with cleft palates and those with cerebral palsy.

The teaching to the undergraduate students of the prevention and correction of simple types of malocclusion and of adult orthodontics for restorative procedures has been most favorably received. This type of service by the general dental practitioner is, indeed, a very important adjunct to his professional care.

The division is concluding the following research projects on problems of the temporomandibular joint, in cooperation with the Department of Anatomy: a serial study of occlusion in mixed dentition; the effect of

orthodontic appliances on the caries rate in children; radiographic findings in Cooley's anemia; the need for obturators in ensuring good speech in cleft palate cases; and the limitations of cleft-palate orthodontics.

The division provided a one-day seminar and three "information nights" for its alumni association. The demand for admission to the sixteen-month certificate course in orthodontics continues to be far in excess of the number that can be accepted. Twenty-three students are enrolled.

DIVISION OF PEDODONTICS

The Division of Pedodontics, under the direction of Professor Solomon N. Rosenstein, is developing its educational program according to the following concepts: *a*) that a more efficient solution of the problems of tooth conservation and oral-disease prevention lies in the expansion of instruction in the various phases of dentistry for children, and *b*) that instruction in the management of pedodontic problems during the undergraduate stage of dental education is an important means of assuring that our graduates will do their part competently in filling the need for pedodontic care.

In general, we emphasize consideration of the patient as an individual rather than procedures, and we stress adherence to a recommended sequence in developing the treatment plan in order to promote the patient's willing cooperation in the work that needs to be done.

One hundred forty children were admitted to the clinic. The total number of visits was 1,360. The average number of visits per child was 9.7. The total number of restorations and treatments was 1,550. Throughout the year, we maintained an average of 1.1 completed fillings (or treatments) per visit, per child. Twenty-five cases requiring pulp management procedures were demonstrated. The pedodontics teaching staff has been undergoing a transition from a staff comprised of full-time teachers to one which, with the exception of the director of the division, is comprised entirely of part-time teachers.

Professor Rosenstein continues to take part in the Sloane-Pediatric study. In addition, studies concerning tooth conservation and normal variations in tooth development and eruption are in progress.

This division, in addition to its undergraduate teaching, is providing graduate and postgraduate instruction. The program for the study of dentistry for the cerebral-palsied child includes a service clinic staffed by two dentists and full-time research by four fellows in dentistry.

DIVISION OF PROSTHETICS

The scope of prosthetics increases constantly; new materials, improved techniques, and greater appreciation of biological aspects require continued revision and condensation of course content. The schedule of courses and

distribution of subject matter has remained the same as it was during the academic year 1952–1953.

Leave of absence for military service was granted to Professor William J. Miller. Dr. Joseph Randi was appointed assistant in dentistry.

The division continues to operate under the handicap of a depleted staff and an extremely heavy teaching load. Only the willing cooperation of the available teachers has made possible the continuation of high standards of teaching in the field of prosthetic dentistry.

DIVISION OF STOMATOLOGY

This division, under the direction of Professor Lewis R. Stowe, continues to be responsible for the teaching of oral diagnosis, roentgenology, and periodontia. The division is divided into sections of periodontia, directed by Professor Frank E. Beube, and a section of diagnosis and roentgenology, directed by Professor Edward V. Zegarelli.

The physical improvements in the diagnosis clinic have not only added tremendously to the efficiency of its operation, but have raised staff morale and have provided a much more desirable environment for student learning. We extend to the Class of 1921 our sincerest gratitude for making these improvements possible. The dedication of this room was held as part of the annual Alumni Day program.

Drs. Joseph Serio, Lawrence Heiman, Jesse Lefcourt, Marcella Halpert, and Robert Crowley have been added to the staff.

The division continues to carry out a very active program of clinical research. Projects are being carried on here at the school and in cooperation with the Francis Delafield Hospital.

The following are the activities of the staff of the section of periodontology during the academic year ending June 30, 1954:

Three students have completed their two-year, full-time study leading to a Certificate of Training in periodontology; six are continuing their studies. Four additional students will be accepted in the first year. Inadequate physical facilities and lack of full-time instructors still limit the number of certificate students that can be accepted.

The first Rose Cohen Memorial Lecture was given on March 31 by Dr. Robert Moyers, head of the Department of Orthodontia, University of Michigan School of Dentistry.

Professor Melvin L. Morris has continued his studies on reattachment, and Professor Frank E. Beube has initiated a study on tissue healing.

RESEARCH LABORATORY

In keeping with the spirit in which it was established at the Dental School, the Central Research Laboratory, directed by Professor Barnet M. Levy, has cooperated in outlining, organizing, and carrying out certain phases of

research with many of the divisions within the Department of Dentistry. The Divisions of Operative Dentistry, Oral Diagnosis, and Periodontology as well as the Division of Oral Surgery have all availed themselves of the facilities of the Central Research Laboratory during the past year.

The central theme of the research program remains approximately the same: the study of problems relating to growth and differentiation with special reference to bone and tooth structure. Many of these problems we have initiated and are studying ourselves; others we have undertaken to solve in cooperation with other laboratories within the Medical Center family. The Radiological Research Laboratory, for instance, has cooperated with us in research on the effects of X-radiation on bone and teeth, and these studies have resulted in several publications. This year, as in previous years, Professor Samuel R. Detwiler's generous cooperation has afforded us the facilities of his aquarium so that work using aquatic forms of animals, especially the salamander, has continued. This work deals primarily with problems of differentiation and growth, especially with relation to the origin of odontoblasts. In cooperation with the research laboratories of the Department of Surgery we have also studied, and are studying, the effects of various toxic agents on the bones of salamanders and rats. Dr. Gabriel C. Godman has been a close cooperator in this program.

DIVISION OF DENTAL HYGIENE

Courses for Dental Hygienists, directed by Professor Frances A. Stoll, registered twenty-six students for the academic year. Twenty-four are full-time; two are part-time. The enrollment of the junior class for September, 1954, will be the largest since the institution of the Bachelor of Science degree in dental hygiene. Fourteen candidates have been accepted.

On July 20, 1953, the American Dental Association, Council on Dental Education, approved the curriculum in dental hygiene and placed Courses for Dental Hygienists on the accredited list.

The Faculty of Medicine authorized the granting of the Master of Science degree in administration, supervision and teaching of dental hygiene. The degree will provide graduate education to fill the growing demand for teachers, supervisors, and administrators in schools for dental hygienists.

The United Cerebral Palsy Associations, Incorporated, provided funds as a fellowship for two academic years of study in dental health care for cerebral-palsied children. The candidates must be graduate dental hygienists with a Bachelor of Science or Bachelor of Arts degree in dental hygiene. The fellowship provides tuition, traveling expenses, and a stipend of $3,000 per year. One candidate will be accepted each year.

A program was presented for teachers, supervisors, and directors in schools for dental hygienists, as part of the Kellogg Conference on Dental Education.

The program included a morning session on methods of administration, supervision, and teaching in dental prophylaxis and an afternoon seminar: "Laboratory Methods and Materials in Manikin Training for Dental Prophylaxis."

The Medical Center dental prophylaxis clinic for adults functioned throughout the school year in the Ogur Clinic of the Dental School. One hundred forty clinics were held; 1,277 patients received dental prophylaxis treatment.

During the fall semester, from October to November, a children's clinic was operated at 15 Amsterdam Avenue. Twelve clinic sessions were held, and 288 children were treated. This clinic was dismantled after thirty-six years of service because the building was to be demolished.

In January, 1954, a new clinic for school children was established in St. Rose of Lima Parochial School, 164th Street and St. Nicholas Avenue. The clinic is fully equipped with five dental units. A survey of the dental needs of each of the 780 children was made. Dental prophylaxis was provided for as many as time would allow (169). Series of topical applications of sodium fluoride were completed.

A third clinic was held one day a week for twelve weeks at St. Mary of the Angels Home for Boys in Syosset. Prophylaxis was provided for 96.

The total of clinical services is 1,277 patient treatments in 146 clinic sessions. The average number of patients treated by each senior student was 110.

In February and May conferences were held in connection with the student teaching program. Professor Margaret Vollmer of the Department of Health and Physical Education, Teachers College, was the speaker for the May conference. Her subject was "Correlation of Health Teaching in the Elementary School Curriculum."

Miss Nellie Robinson was appointed director of the College for Dental Hygienists, University of Texas. Miss Nancy Risdon has been selected to start the Dental Health Service Program for the American Fire Insurance Companies. Three students have accepted dental hygiene teaching positions in public schools. Two students will be employed as instructors in dental hygiene schools.

The alumnae association now has 435 members.

DIVISION OF CLINICAL ORAL PHYSIOLOGY

This division was established during the year under the direction of Dr. L. Laszlo Schwartz for the purpose of relating clinical research and teaching more closely with the basic physiological science. Aided by an anonymous gift, the establishment of permanent quarters, and an increase in staff, many steps have already taken to achieve these aims.

The temporomandibular joint clinic, from which this division evolved, is continuing studies of the complex problems of temporomandibular joint pain and dysfunction. Investigations have led to the conclusion that these symptoms usually result from a functional disturbance of masticatory and other muscles and not from joint disease. Dr. L. Laszlo Schwartz has reported these findings in the *Journal of the American Dental Association* under the title, "Ethyl Chloride Treatment of Painful, Limited Mandibular Movement." In collaboration with Professor Daniel P. Tausig of the Department of Anesthesiology, a preliminary report was published in the *New York State Dental Journal* entitled, "Temporomandibular Joint Pain: Treatment with Intramuscular Infiltration of Tetracaine Hydrochloride."

Psychiatric examinations by Dr. Ruth E. Moulton of the Department of Psychiatry revealed the relationship between emotional and muscular tension in temporomandibular joint pain and dysfunction. Dr. Moulton's paper was presented before the symposium of the School of Dental and Oral Surgery held during the celebration of the twenty-fifth anniversary of the Medical Center.

A group representing several departments of the Medical Center are continuing investigations. Represented are Dr. Herman Schwartz of the Department of Anesthesiology, Dr. Charles T. Ryder of the Department of Orthopedic Surgery, Professor Jules G. Waltner of the Department of Otolaryngology, Professor Charles A. Ragan, Jr., of the Department of Medicine, Dr. James B. Campbell of the Department of Neurological Surgery, Dr. Christian Herrmann of the Department of Neurology, Dr. Ruth E. Moulton of the Department of Psychiatry, and Professors Josephine S. Wells and Juan M. Taveras of the Department of Radiology. The School of Dental and Oral Surgery is represented by Dr. Charles M. Chayes, Dr. Harold P. Cobin, Dr. Stanley L. Lane, Professor Barnet M. Levy, Dr. L. Laszlo Schwartz, and Professor Lewis R. Stowe.

During the year, the following investigations were initiated: by Dr. Chayes —motion picture studies in clinical oral physiology; by Dr. Cobin—factors related to the onset of temporomandibular joint pain and dysfunction; by Dr. Schwartz—the treatment of rheumatoid arthritis of the temporomandibular joint with the intra-articular infiltration of hydrocortisone acetate (in collaboration with Professor Ragan) and an electromyographical study of the masticatory muscles in function and dysfunction (in collaboration with Dr. Herrmann).

Through close cooperation with Professor Nicholas DiSalvo of the Department of Physiology, steps have been taken to integrate clinical teaching with basic physiological science on both the undergraduate and the graduate levels.

During the year Dr. Schwartz was named president of the American Academy of the History of Dentistry.

DEPARTMENT OF DERMATOLOGY

Professor Carl T. Nelson, Executive Officer

The teaching program for undergraduate students has undergone no extensive change during the past year. It has become increasingly evident, however, that the assignment of fourth-year students for clinical instruction at hours when the dermatologic outpatient section of Vanderbilt Clinic is closed is not satisfactory from a teaching standpoint. Consequently, plans have been completed to expand the case work teaching activities for fourth-year students in the wards and clinics of the United States Public Health Service Hospital, Stapleton, Staten Island. Beginning in June, 1954, approximately 40 percent of the time allotted to fourth-year teaching in dermatology will be spent in that hospital. Clinical instruction there will be under the direction of Dr. Benjamin J. Chester.

The training program for graduate students and residents, outlined in previous reports, was augmented during the past academic year. Additions include demonstrations of the basic applications of physical therapy by Dr. Charles F. Post and lectures on the chemistry and physiology of the skin by Dr. George W. Hambrick, Jr. The regular weekly seminars under Professors Paul Gross and Beatrice M. Kesten were again held.

The active participation of members of the department in the proceedings of dermatological and other scientific organizations continued during the year. Fifteen members gave scientific presentations at various medical meetings.

Again this year a large number of research projects were undertaken by members of the department. Professor George C. Andrews and Dr. Anthony N. Domonkos completed a study of the association of certain types of hemangiomas and retrolential fibroplasia. Dr. Domonkos also investigated the threshold erythema dose of low-voltage roentgen rays. The results of this work will be published shortly.

Professor Rhoda W. Benham and Dr. Marguerita Silva continued the study of the nutritional requirements of dermatophytes, begun two years ago. This work has been supported by a grant from the United States Public Health Service and has yielded important data on the relationship of the virulence of these microorganisms and pigment production. Professor Benham, with Mrs. Christine Alexio, also investigated the morphological and antigenic variations encountered in the genus *Candida.* This study has been aided by a grant from Eli Lilly and Company. Another investigation undertaken by the mycology division under Professor Benham's direction has been a survey designed to establish definite criteria for the separation of pathogenic and nonpathogenic varieties of cryptococci. At the United States Public Health Service Hospital, Staten Island, Dr. Chester has carried out

a study of the pattern of treponemal immobilization reactions in the sera of patients in the various stages of late syphilis. These data have provided additional information on the persistence of this antibody in treated and untreated cases of the disease.

Dr. Helen O. Curth continued the study of the relationship of acanthosis nigricans to cancer. This investigation has been supported by a grant from the United States Public Health Service and now has been broadened to include a survey of the relationship between malignant tumors of internal origin and other dermatoses. Dr. Curth's investigation of the genetic relationships of patients with various forms of icthyosis, started last year, has been completed. The results are now ready for publication.

Dr. Hambrick and Dr. Harvey Blank studied the microanatomy of the epidermis and appendages by a method which utilizes whole mounts of unfixed tissue. Their findings suggest that this technique may have wide application in the future studies of the secretory functions of the skin. Dr. Justina H. Hill completed a study of the Hardy-Hollander agglutination test for syphilis, which employs *T. pallidum* as an antigen. Although this reaction is closer to the treponemal immobilization test in its behavior than are the standard serological tests for syphilis, it appears that the antigen for the agglutination test is not yet suitable for general use in clinical laboratories.

Professor Gross, in collaboration with Drs. Chester and Milton B. Sloane, extended the study of the alkali-neutralizing properties of the skin in nummular eczema and various eruptions of occupational origin. The results indicate that impaired ability of the skin to neutralize alkali may be a basic defect in many eczematoid states. Professor Kesten and Dr. Meyer H. Slatkin have completed their study of the physical factors underlying light sensitivity in certain dermatoses. Professor Kesten has also continued the investigation of methods of topical treatment for resistant types of onychomycosis.

Professor J. Lowry Miller with Drs. Marvin Brodey, Hill, Slatkin, and Harry L. Wechsler, has continued the investigation of the specificity of the treponemal immobilization test and its value in excluding the diagnosis of syphilis in biological false positive reactors. This work has been aided by a grant from the Division of Venereal Diseases, United States Public Health Service, and the Department of Health of the State of New York. It has provided valuable information on the pattern of transfer and the persistence of immobilizing antibody in babies of syphilitic mothers as well as the behavior of this antibody in spinal fluid. Professor Miller in collaboration with Miss Balbina A. Johnson of the Department of Surgery completed a study of the value of erythromycin and a combination of erythromycin and neomycin in the treatment of pyodermas. This study also yielded additional data on the trend of variations in the resistance of skin microorganisms to the common antibiotics now in use.

Mrs. Julia M. Einbinder and Professor Nelson extended the investigation of the effects of cortisone and other hormones on tissue electrolyte changes during anaphylactic shock. Dr. Wechsler and Mrs. Einbinder continued the study of protein metabolism in psoriasis and its relationship to alterations in the clinical course of this disease. Dr. Wechsler and Professor Nelson, in conjunction with Professor Charles R. Dawson of the Department of Chemistry, initiated an investigation of the antigenic relationships of various catechols and the active principles of poison ivy. Data were obtained in experimental animals which suggest that the administration of certain catechol derivatives may decrease the reactivity of the skin to extracts of poison ivy.

Several outstanding distinctions came to members of the department in the past year. Professor Andrews served as vice-president of the American Dermatological Association and Professor Kesten became a member of the American Board of Dermatology and Syphilology. Professor Miller was chairman of the Section of Dermatology and Syphilology of the New York Academy of Medicine and Dr. Blank was appointed a member of the Subcommittee on Foot Protection of the National Research Council.

DEPARTMENT OF MEDICINE

Professor Robert F. Loeb, Executive Officer

The past year has witnessed an unusually large number of changes in the staff of the department. Professor Robert L. Levy will become professor emeritus of clinical medicine on July 1, 1954, after devoting many fruitful years to research and teaching. Professor Martin DeForest Smith has retired after more than forty years dedicated to teaching and care of patients in the Department of Medicine; his precepts of devotion to the care of the sick have left an enduring impression on generations of students. Assistant Professors Irving M. London, Gilbert H. Mudge, and John V. Taggart were promoted to the rank of associate professor. Professors Charles A. Flood, Joseph W. Jailer, K. Jefferson Thomson, and Sidney C. Werner were advanced to associate professors of clinical medicine. Dr. John R. West was promoted to assistant professor of medicine. Doctors Marcel Goldenberg, Putnam C. Lloyd, and Herbert B. Wilcox, Jr. became assistant clinical professors and Dr. Albert R. Lamb, Jr., assistant professor of clinical medicine. Dr. James K. Alexander has resigned to become assistant professor of medicine at Baylor University College of Medicine, and Dr. Edward E. Fischel has been made director of the Medical Service of the Bronx Hospital. Dr. Harry Greisman resigned after many years as associate. Professor I. Herbert Scheinberg, who came to Columbia University from Harvard Medical School, was appointed assistant professor assigned to the Department of Psychiatry. It is gratifying to report that three members of the staff have declined five

opportunities to head departments of medicine elsewhere in the country. This constitutes a tangible tribute to the loyalty of the staff and the opportunities offered in full-time positions at Columbia.

Many distinctions have come to various members of the department in the past year. Professor Michael Heidelberger became the recipient of a Lasker Award and is the second member of the department to be so honored. He also received the international Emil von Behring Prize for 1954 at the University of Marburg, Germany. Professor Heidelberger also received the City College's Bicentennial Lecture Award and Baskerville gold medal for his contributions to immunochemistry. He also shared in the Leopold II Award for the cure of African sleeping sickness and was made an Officer of the Ordre de Leopold II by the Belgian Government for this work. Professor Stanley E. Bradley became a director of the American Heart Association and a member of the editorial board of the *Journal of Medical Education*. He also served as director of the Commission on Liver Diseases of the Armed Forces Epidemiological Board. Professor Bradley lectured at a number of British universities and at the University of Leiden in Holland. Professor Irving M. London was presented with the Theobald Smith Award of the American Association for the Advancement of Science. Professor David Seegal became associate editor of the new *Journal of Chronic Diseases*. Professor Robert L. Levy was president of the American Clinical and Climatological Association. He also served as consultant in cardiology to the New York State Department of Health and is a member of the editorial board of the *Journal of Chronic Diseases*. Professor Gilbert H. Mudge delivered the Alpha Omega Alpha address at the University of Vermont. Professor Yale Kneeland became a trustee of the American University of Beirut and the director of the Common Cold Foundation. Professor Dickinson W. Richards delivered the Mary Scott Newbold Lecture in Philadelphia and Professor André Cournand was lecturer and visiting consultant at the University of Louisville. Professor Joseph W. Jailer delivered lectures in England, Belgium, France, and Switzerland. Professor John V. Taggart delivered lectures in London and Montreal. Professor George A. Perera lectured in London and Cambridge, England. He also became a member of the Board of Directors of the New York Heart Association and was chairman of the Section on Medicine at the New York Academy of Medicine. Professor Franklin M. Hanger organized the postgraduate course of the American College of Physicians held here at the Medical School. He was president of the American Society for the Study of Liver Disease, and he has also been made consultant to the American Hospital in Paris. Professor Joseph C. Turner participated in a conference on leukemia held in London. Professor Charles A. Ragan, Jr., addressed the International Congress on Rheumatic Disease in Geneva, Switzerland. He also was president of the American Rheumatism Association and was chairman of the Metabolism and Nutrition

Study Section of the National Institutes of Health and was editor of the Josiah Macy Foundation Conference on Connective Tissues. Professor Karl Meyer gave lectures at Washington University and the University of Wisconsin. Dr. Edward E. Fischel lectured at Yale and at a seminar of the Florida Heart Association. Professor J. Burns Amberson delivered the John W. Bell Lecture at the University of Minnesota. He gave the Tyndale Lecture of the University of Utah and received the Bruce H. Douglas Award of the Michigan Trudeau Society. Professor Alvan L. Barach delivered the Stoneburner Lectures of the Medical College of Virginia among many other lectures. Professor Robert F. Loeb received the honorary degree of LL.D. from the University of Wales. He was elected an honorary fellow of the Royal Australasian College of Physicians and was elected to the Danish Society of Internal Medicine. He was also elected president of the Association of American Physicians.

No important changes have taken place in the curriculum of the Department of Medicine in the past year. The practice of bringing distinguished men in the various branches of medical science to participate in teaching exercises has continued. Sir Rudolph Peters of the University of Oxford gave the Randolph West Memorial Lecture. Professor H. Malmros and Dr. Åke Nordén of the University of Lund, Sweden, lectured at one of the medical conferences. Professor U. S. Von Euler of the Karolinska Institute in Stockholm, Sweden, and Professor Frank G. Young of the University of Cambridge, England, also lectured. Dr. Asboe-Hansen of Copenhagen and Dr. Bernt Hökfelt of the Karolinska Institute gave departmental seminars. Dr. Charles H. Rammelkamp of Western Reserve University, Dr. Tinsley Harrison of the University of Alabama, and Dr. D. W. Wooley of the Rockefeller Institute participated in the combined clinics.

Dr. J. R. K. Preedy of the London Hospital, Dr. Charles Toussaint of the University of Brussels, Dr. John R. Martin of McGill University, and Dr. Bernt Hökfelt have been foreign visiting fellows in the department during the year. There have also been working in the department fellows of the National Research Council, the American Cancer Society, the United States Public Health Service, the American Arthritis and Rheumatism Foundation, the Life Insurance Medical Research Fund, the New York Heart Association, and the Damon Runyon Memorial Fund.

Numerous grants from governmental and nongovernmental sources have in the past year continued to make possible a highly active research program in the department. The bibliography of the department last year included 125 publications. In the laboratory of Professor Stanley E. Bradley studies of liver and kidney function have continued along lines laid down in the past few years. Dr. Peter C. Reynell, a fellow from Oxford, completed studies of the effect of hemorrhage on splanchnic blood flow and splanchnic blood volume in the dog, begun in 1952 with Drs. Paul A. Marks and Meltzer.

Dr. Richard M. Hays devoted attention to the development of a method for measuring splanchnic blood volume with labeled serum albumin and labeled red cells simultaneously, in order to determine the splanchnic hematocrit. An investigation of the distribution of circulation times across the splanchnic vasculature has been inaugurated in collaboration with Dr. Wheeler. Drs. Cominsky, Preedy, and Hays have completed a study of the effect of hexamethonium bromide on splanchnic blood flow and volume. It has been found that blood leaves the splanchnic bed during and following blood loss, serving in a compensatory manner to support circulating blood volume and maintain return of blood to the heart. During the hypotensive state induced by hexamethonium, however, the splanchnic blood volume increases, thus contributing in the production of diminished cardiac output.

Much time has been devoted by Professor Bradley and Dr. Preedy to a study of dextran and protein clearances in patients with proteinuria. Dr. Preedy has devised a method of determining inulin in the presence of dextran. The clearances of specially prepared fractions of dextran supplied by the National Research Council have been determined in patients with proteinuria. It is hoped that these studies will throw light on the pathogenesis of proteinuria. Mrs. Katherine Baker has continued to refine the paper electrophoresis method as a means of determining individual protein clearances. Measurements of the distribution of nephron delays during anesthesia and in patients with uremia have continued in collaboration with Dr. Edgar Leifer, Professor Emanuel M. Papper of the Department of Anesthesiology, and Professor David V. Habif of the Department of Surgery.

During this year Professor Irving M. London has continued studies in the fields of hemoglobin and protein metabolism. Studies on the biosynthesis of heme and on the effects on this synthesis of agents such as folic acid and its inhibitors, lead, copper, and extracts of yeast, have been carried out in conjunction with Dr. Elhanan Dimant of Israel and Dr. Nicholas B. Myant of London. Immature mammalian and avian erythrocytes provide a system in which the processes for synthesizing the heme and protein moieties of hemoglobin can be dissociated. In the course of this work, Dr. Myant has modified and developed a method for the isolation of glycine in pure form from relatively small amounts of protein. In studies on the origins of bile pigment, isotopically labeled porphyrins which occur in mammalian tissue have been prepared for investigation of their relationship to the synthesis of bile pigment.

In investigating the mechanism of aging in human erythrocytes, the metabolic behavior of various constituents of the erythrocyte is under study. Glutathione is of particular pertinence to this problem. In association with Dr. Dimant, Miss Edith Landsberg, and Mrs. Halina Morell, Professor London has found that human, rabbit, and avian erythrocytes in vitro incorporate glycine into their glutathione at a rapid rate. This incorporation occurs in lysed as well as intact cells, and occurs in the post-hemolytic residue

of the erythrocyte and not in the supernatant portion of the hemolysate. In a study in man with the use of N^{15} labeled glycine, the glutathione of the erythrocyte is found to be in the dynamic state and the nitrogen of the glutathione derived from the labeled glycine has a half-lifetime of approximately four days. In conjunction with Dr. Helen M. Ranney and Miss Grace Vanderhoff, Professor London has continued studies on the formation of antibody protein in surviving mammalian tissues. These have been extended to investigation of synthesis of antibody protein in non-intact cells of the spleen.

Professor I. Herbert Scheinberg has investigated the structural differences between various human hemoglobins. This has been done largely by a correlation of the acid-base titration curves of these hemoglobins with the results of differential titrations carried out by means of paper electrophoresis. The results provide strong evidence that sickle-cell anemia hemoglobin differs from normal adult hemoglobin in possessing about three less free carboxyl groups per molecule. Hemoglobin C, another abnormal hemoglobin, appears to have about six less free carboxyl groups than normal adult hemoglobin. These methods of investigation are being applied to the study of other human hemoglobins as well as to other groups of closely similar proteins. Studies have also been continued on the levels of ceruloplasmin in various neurologic and hepatic diseases.

Professor John V. Taggart and Dr. David Schachter have been engaged in studies on the enzymatic synthesis of hippuric acid and certain related glycine conjugates. The enzyme which catalyzes the transfer of the benzoyl group from benzoyl-Coenzyme A to glycine has been isolated from the mitochondria of beef liver in an essentially homogeneous state, as judged by electrophoresis and ultracentrifuge studies. This enzyme has now been shown to transfer a variety of acyl groups, both aliphatic and aromatic, from the corresponding acyl thioesters of CoA to glycine, and therefore has been named "glycine-N-acylase." The demonstration of this enzyme in the liver and kidney tissue of a variety of mammalian species raises anew the question of the physiological importance of the N-acylglycine compounds. Of particular interest are the studies relating the activity of this enzyme to the renal mechanism responsible for the tubular excretion of p-aminohippurate, diodrast, etc. Earlier observations have shown that various fatty acids exhibit a potent inhibitory effect on this transport mechanism. These observations can now be explained on the basis of the synthesis in kidney of the corresponding acylglycines, their accumulation by the kidney, and consequently their competition with the usually transported substances. Additional studies have been concerned with the conversion of carinamide, a pharmacological agent used for the suppression of tubular excretion, to carinamidyl-CoA. This acyl-CoA, prepared both enzymatically and chemically, exhibits unusual chemical properties which may underlie the pharmacodynamic effects of the parent drug.

Professor Gilbert H. Mudge, in collaboration with Dr. Hans W. Neuberg,

has continued his studies on the action of dinitrophenol on aerobic phosphorylation—work which has continued as an outgrowth of studies on the metabolic aspects of electrolyte transport in cell-free systems of mitochondria. The phosphorylation now under investigation involves the formation of phospho-enol-pyruvate. Dynamic aspects of the metabolism of this ester have been defined; current observations suggest that, unlike other aerobic phosphorylations, its formation may not be mediated via the adenylic system. In association with Professor Mudge, Dr. Helen M. Anderson is carrying out studies on the mechanisms of anion transport in slices of kidney cortex.

A study has been completed by Dr. John H. Laragh on the effect of potassium chloride on hyponatremic patients. Studies in normal dogs confirm the fact that significant temporary increases in serum sodium may occur after potassium chloride feeding and the observed changes may be augmented by prolonged sodium restriction. The exquisite sensitivity of the sodium-depleted organism to potassium has also been confirmed, and the data suggest that this sensitivity is not related to defective capacity for renal excretion of potassium. In addition, with the cooperation of Professor Harry B. van Dyke of the Department of Pharmacology, it has been shown that experimental ascites can be readily produced in a dog with no demonstrable posterior pituitary function. The ascites is not modified by water restriction. Using normal dogs and dogs with diabetes insipidus, the hormonal factors in the production of ascites are under study. Measurements of the pituitary antidiuretic hormone, as well as the sodium-retaining hormone of the adrenal cortex are being carried out during the formation of edema. In addition, it has been possible to measure the excretion of these hormones at extremely low and extremely high levels of serum sodium in animals with and without edema. The objective of this latter study is to determine whether or not the blood sodium concentration is a factor in the elaboration of the mineral hormone of the adrenal cortex. This study is being carried out with the cooperation of Professor Jailer.

Professor Ragan and his associates in the Faulkner Clinic have continued their long-term clinical study of rheumatoid arthritis, including a number of patients on long-term cortisone or ACTH therapy. Enthusiasm for the hormonal therapy of this disease has moderated with the passage of time. Professor Ragan is continuing to test various anti-inflammatory agents in patients with rheumatoid arthritis at the Presbyterian and Goldwater Memorial Hospitals. None have been found to replace cortisone, and in patients with severe disease on long-term cortisone therapy, it has not been possible to withdraw the hormone without grave consequences. A long-term follow-up study of patients with rheumatoid spondylitis has been begun. Studies on connective tissue regeneration modified by cortisone have continued with Professor Raffael Lattes of the Department of Surgery. Evidence has accumulated suggesting that both local infection and cartilage powder will overcome the cortisone effect.

Dr. John R. Martin is studying the lathyrism produced in rats by feeding sweet-pea seeds. The lesion produced is one of cartilage and may yield information concerning its turnover. He is also studying with Dr. Herbert C. Stoerk, of the Merck Institute, the chronic arthritis produced in rats by homologous or heterologous spleen plus Freund's adjuvant. This arthritis has many clinical similarities to rheumatoid arthritis in humans. A tissue culture laboratory has been established in the histochemical laboratory of the Department of Surgery and attempts are being made, by using mass culture techniques, to correlate histochemical observations with biochemical (isolation) techniques. The inhibitory effect of adrenal steroids upon fibroblasts in tissue culture has been studied by Dr. Henry Grossfeld in this laboratory.

In continuation of work on the structure and function of substances derived from connective tissues, Professor Karl Meyer and his associates have isolated a hitherto unknown mucopolysaccharide, chondroitin. This polysaccharide presumably is the sulfate acceptor of the connective tissues. In collaboration with Dr. Alfred Linker, the structure of the disaccharide produced by bacterial hyaluronidases from hyaluronic acid is being studied. This disaccharide represents a new type of unsaturated uronic acid with the double bond in 4–5 position of the uronic acid. In collaboration with Mr. Eugene A. Davidson, Professor Meyer is studying the structure of the chondroitin sulfates. The basic repeating unit of chondroitin sulfate A has been crystallized. The study of its structure is nearly completed and the study of the ground substances of bone and their relation to calcification has been initiated, in part in collaboration with the tissue culture laboratory of Dr. Gabriel C. Godman in the Department of Surgery.

Dr. Baruch S. Blumberg has started to measure size and shape of hyaluronic acid and chondroitin sulfate particles, isolated from different sources, with a series of biophysical techniques. It is intended to utilize the methods in a study of polysaccharides in disease states and in in vitro biosynthesis of the mucopolysaccharides.

Quantitative immunochemical studies with synthetic polyglucose, with glycogens, and with amylopectins have been continued by Professor Michael Heidelberger and Mr. John Adams, measurements being made of the surprisingly large quantities of carbohydrate in the specific precipitates. A galactan from beef lung was found to precipitate antipneumococcus Type XIV serum, as did also a sample of tamarind seed polysaccharide. Since the two polysaccharides contain only a single form of galactose residue in common, it seems safe to predict that this same residue will be found among the three galactose units known to occur in the capsular polysaccharide of Type XIV pneumococcus. The tamarind substance also contains glucose linked like that in the repeating unit of the type II pneumococcal polysaccharide, and, as expected, reacts in type antiserum. Dr. Otto J. Plescia with Mr. Kenneth Amiraian, in Professor Heidelberger's laboratory, has been studying equilibrium effects between complement and sensitized red cells, finding a marked

concentration effect which is different with the complements of different species. The technique of carrying out quantitative experiments on the velocity of hemolysis has been simplified and a new standardization of complement has been proposed, based on the half-time of hemolysis. As a result, it appears possible to differentiate complements not only in terms of their relative capacities to lyse cells, but also in terms of their thermodynamic and kinetic behavior. Professor Heidelberger has also continued the study of rabbit antisera to the factor in mouse milk connected with mammary carcinoma. Dr. Plescia is exploring the physical chemical methods aimed at further purification of the milk factor. Mr. Arnold B. Powell has condensed crystalline egg albumin with beta-iodopropionamide, iodoacetdiphenylamide, iodoacetdicyclohexylamide, and iodoacetdiethylamide and is studying the products. Dr. Bertil Björklund, of the State Bacteriological Institute, Stockholm, has begun to work with Professor Heidelberger.

Professor John R. West has extended his studies of pulmonary function in rheumatic heart disease. The present emphasis is upon disturbances in mechanics of breathing rather than alterations in gas exchange or in quantitative aspects of pulmonary ventilation. The data accumulated indicate that long-standing pulmonary hypertension results in increased work of breathing, although its exact relationship to increase effort in breathing has not yet been worked out. In collaboration with Dr. James K. Alexander, studies have been completed on the ventilatory response of patients with chronic pulmonary emphysema to carbon dioxide inhalation. A diminished sensitivity of the neural centers controlling ventilation to changes in arterial hydrogen ion concentration as well as carbon dioxide partial pressure was observed in every patient with chronic carbon dioxide retention. Patients without respiratory acidosis did not differ from the normal. That the diminished sensitivity in the group with carbon dioxide retention is not related to acidosis per se, or to the arterial hypoxia which usually accompanies the respiratory acidosis, is indicated by the normal or heightened response to the carbon dioxide stimulus which was observed, first, in a group of patients with chronic metabolic acidosis, and second, in a group of patients with chronic arterial desaturation due to congenital heart anomalies. The lessened sensitivity seems, rather, to be directly related to the elevation in serum carbon dioxide content per se because it was observed in patients with chronic metabolic alkalosis who had no pulmonary disease. An increased sensitivity of the respiratory center to changes in arterial carbon dioxide tension and hydrogen ion concentration in subjects receiving salicylates was established with the help of Mr. Harold Spalter, a third-year student. In cooperation with Dr. Charles W. Frank progress was made in the isotope injection method of measuring cardiac output, but as yet it is not applicable in clinical research.

Professor René Wégria, with Drs. Charles W. Frank, Hseuh-hwa Wong, Marvin R. Blumenthal, Peter Kornfeld, and R. D. Seely, has carried on a study of intercoronary reflexes in which it was found that when one of the

three main coronary arteries is suddenly occluded, the blood flow in the other two arteries remains unaltered or increases. In an occasional experiment in which the occlusion of one coronary artery leads to a decrease in the blood flow of the other two arteries, this decrease in flow is always adequately explained by a marked decrease of the mean arterial blood pressure. This work affords no evidence that there exists, at least in the dog, an intercoronary reflex leading to reflex vasoconstriction in the coronary bed. As a preparation for studies on cardiac metabolism, a study on the venous drainage of the coronary blood has been completed. It was found by Professor Wégria and his coworkers that when the work of the right ventricle is increased by constriction of the pulmonary artery, the right coronary flow increases unless the constriction of the pulmonary artery is severe enough to result in a marked decrease of the aortic blood pressure. In these instances in which the increase of the right coronary flow is accompanied by an increase in the coronary sinus outflow, there occurs regularly an increase in the left coronary artery flow commensurate with the increase in the coronary sinus outflow. If, during the increase of the coronary sinus outflow resulting from the constriction of the pulmonary artery, the right coronary artery is suddenly occluded, no change in the coronary sinus outflow occurs, whereas occlusion of the left artery results in a dramatic decrease of the coronary sinus outflow. These experimental data seem to indicate that the increase in the coronary sinus outflow is due to an increase in the left coronary flow and not to drainage of the right coronary blood into the sinus as had been postulated. With Mr. Dudley Rochester of the third-year class it was established by Professor Wégria and others that even large doses of lanatoside C, when injected intravenously during a bout of electrically induced ventricular tachycardia, do not induce ventricular fibrillation in the dog.

Professor Robert L. Levy, together with Drs. Roger B. Lochhead and Laragh, carried on a study of effects of praenitrona, a new, long-acting nitrite, in coronary disease, especially for the relief or prevention of anginal pain. This is a drug used with apparent success in Germany, as reported in numerous publications. In a small but carefully controlled series of observations in patients, the conclusion has been reached that it is without value. This group has also been studying a new combination of aminophyllin with a resin to prolong and enhance the vasodilator action on the coronary arteries by aminophyllin. This work is still in progress. Professor John L. Nickerson of the Department of Physiology and Dr. James A. L. Mathers have continued studies on the basic physical properties of the forces generated by the heart beat, how to record these with minimal distortion, and to evaluate their significance in clinical medicine. Work has been continued on humans and animals in an effort to improve the calculations of the cardiac output from ballistocardiographic tracings. In cooperation with Dr. Sylvia G. Traube and Mr. Richard H. Osborn, Dr. Mathers is carrying on studies comparing and contrasting the cardiovascular systems of identical twins on the basis of

history, physical examinations, electrocardiograms, and ballistocardiograms.

Further studies by Dr. Edward E. Fischel on the biological significance of serum complement are in progress. It has been found that the "acute phase" increase in serum complement is unrelated to the appearance of C-reactive protein, or elevation of the sedimentation rate. Another "acute phase" phenomenon, the appearance of the bactericidal substance of Tillet, is being studied. With Dr. Åke Nordén, Dr. Fischel extended his study of certain aspects of the quantitative fixation of complement in vivo during passively induced anaphylaxis in the guinea pig. As might be anticipated from in vitro studies, the fixation of complement appears to be directly related to the amounts of antibody and antigen used to elicit anaphylaxis.

Factors influencing antibody production have been studied by Dr. Fischel, and the effects of triiodothyronine and of salicylate are under investigation. As a sequel to the experience obtained with Dr. Charles W. Frank in the Cooperative Study on the Management of Rheumatic Fever of the United States Public Health Service, attempts to affect rapid, uninterrupted, and prolonged suppression of the rheumatic process by combined use of cortisone or hydrocortisone and aspirin have been resumed. It has not been possible consistently to suppress the rebound phenomenon, but on the whole, the continuation of salicylate appears to diminish the severity of this reaction.

Professor William B. Sherman is studying the effects of alum-precipitated pollen extracts in patients who are unable satisfactorily to tolerate the ordinary injections of soluble pollen extracts, particularly of ragweed pollen. The work is in the relatively early stages but gives promise of improved results in at least a portion of the patients with hay fever who have previously been difficult to treat.

During the past year Professor George A. Perera has continued studies on hypertensive vascular disease, accumulating data on 500 patients followed until death, 150 of these having been followed from before the onset of the disorder throughout its entire evolution. In addition he has made a detailed investigation of the action of rauwolfia serpentina with the conclusion that its mild hypotensive and tranquilizing effects are primarily central in origin and of benefit only in patients with uncomplicated hypertensive disease. Metabolic studies with dehydroisoandrosterone, benemid, and methyl donors were undertaken but gave negative results. Clinical trials with hexamethonium compounds in the accelerated phase of hypertensive vascular disease have also been conducted. Professor Marcel Goldenberg studied the influence of Dopa-decarboxylation inhibitors in rats by using 2,5-Dopa. Rat adrenals showed a definite lowering of catechol amine content, most likely due to inhibition of nor-adrenaline and adrenaline synthesis. On the other hand, 3,4-Dopa caused an increase of the catechol amine content of the adrenal medulla. Since both compounds constitute alternate pathways of tyrosine metabolism, the problem is to be studied more extensively. Dr. Bernt Hökfelt, working with Professor Goldenberg, has studied the effect of these

Dopa derivatives on the catechol amine content of the adrenal glands after their depletion of adrenaline by insulin hypoglycemia. Dr. Hökfelt has also, with the assistance of Miss Jane A. Heitmann of the third-year class, been studying by cross-transfusion experiments the effect of hypertensive blood of the donor rat upon the blood pressure of normal and salt-fed recipient rats.

Professor Abbie I. Knowlton and Dr. Emily N. Loeb, in conjunction with Dr. Stoerk, have inquired into the question of whether the hypertension seen in cortisone acetate-treated rats was related to the weight loss which customarily ensues in such animals. The addition of 10 percent desiccated whole-liver powder to a low-sodium "complete" synthetic diet was found to prevent the weight loss in cortisone-fed rats. However, severe hypertension developed, as it did in animals on the basic diet, as did other evidences of steroidal action (i.e., adrenal and thymic atrophy). Prevention of weight loss could not be demonstrated if the hormone was presented subcutaneously rather than orally, or if the animals were adrenalectomized. Professor Knowlton and Dr. Loeb are studying techniques of rat tissue analysis preparatory to comparing muscle and carcass concentrations of electrolytes in various forms of renal and steroidal hypertension. Dr. Charles Toussaint of the University of Brussels collaborated in part of these experiments.

Professor Joseph W. Jailer, in the laboratories of the Department of Obstetrics and Gynecology and in collaboration with Drs. Jay J. Gold, Eleanor Wallace, and Raymond Vande Weile, has extended his studies on the steroidal defect in congenital adrenal hyperplasia. The original hypothesis of the existence of an enzymatic block which prevents the full hydroxylation of hydrocortisone precursors has been further substantiated. During the past year this group has made an extensive study of the problem of hirsutism in women. An attempt has been made to correlate the clinical picture with the urinary steroid pattern. It has been found that there is a group of hirsute women without adrenal tumors who excrete large amounts of dehydroisoandrosterone. On cortisone therapy dehydroisoandrosterone disappears from the urine. There is another group of hirsute women whose urinary excretion pattern is normal and whose other symptoms, e.g., amenorrhea etc., are improved by wedge resection of the ovaries. Consequently, it appears that in the first group the origin of the syndrome is adrenal, whereas in the second, the primary difficulty lies in the ovary. A technique is being developed for the separation of the components of the human urinary gonadtrophin complex and it now appears possible that the follicle stimulating FSH component can be separated from the ICSH component by means of column chromatography. With this technique it is hoped better to understand the interrelationship of this complex during the menstrual cycle and in certain ovarian and testicular diseases.

The research of Professor Sidney C. Werner was devoted to several facets of thyroid disease and to a study of the relative importance of both hormonal concentration and the total amount of available hormone in the production of

hormonal effect. Six patients with early Graves' disease manifested only by eye signs and without hyperthyroidism were observed. The responses of the thyroid to triiodothyronine and thyrotropin were studied and were found to be the same as those of the toxic glands of active hyperthyroidism. This implies that the thyroid is already involved in the disease process before the appearance of overt hyperthyroidism. The failure of the 24-hour uptake of I^{131} to decrease in active Graves' disease in response to triiodothyronine, unlike the sharp response of normal subjects, has been investigated for its diagnostic possibilities and appears to have valuable potentialities. In addition, a method combining 24-hour I^{131} uptake and 72-hour SPI^{131} determinations after a single 15 microcurie dose of I^{131} has been worked out and offers simplicity in diagnosis for most patients (80 percent with the 24-hour uptake alone) and an over-all accuracy of about 90–92 percent with the combined procedure. The nature of the eye changes in Graves' disease has been studied in collaboration with Dr. Robert M. Day of the Department of Ophthalmology. An inflammatory origin to the edematous phenomena has been indicated, rather than vascular obstruction, as judged by the rate of removal of Na^{24} from the orbits of these and control subjects.

During the past year the study of the occurrence of varieties of hemoglobin by filter paper electrophoresis has been continued by Dr. Helen M. Ranney. This method permits identification of three varieties of hemoglobin: normal adult, sickle cell hemoglobin, and hemoglobin C. The presence of fetal hemoglobin may be suggested by the filter paper method, but is confirmed by the use of alkali denaturation. The combination of sickle cell hemoglobin and hemoglobin C has now been encountered in thirteen patients; all of these patients have a clinical syndrome which is somewhat milder than classical sickle cell anemia. In addition, three patients whose hemoglobin is almost entirely of the C variety have been detected, and these three cases permit tentative conclusions about the clinical manifestations of a newly recognized intrinsic defect of the erythrocyte—hemoglobin C disease. This disease is characterized by a mild hemolytic anemia, splenomegaly, and great numbers of target cells on smears. Studies of the occurrence of these hemoglobins in families confirm the hypothesis that the genes for sickle cell and C hemoglobins are inherited as simple Mendelian dominants. Evidence is accumulating that the genes for sickle and C hemoglobins are alleles. The occurrence of hemoglobin abnormalities in mice is also under study, as is the association of these abnormal hemoglobins with various clinical manifestations. The identification of other abnormalities of human hemoglobin by various methods is also being examined.

Dr. Stuart W. Cosgriff has evaluated the new anticoagulant agent, coumadin. In a study of approximately two hundred patients the incidence of bleeding has been negligible and the therapeutic effect has been highly satisfactory. Thus, this agent seems to have distinct advantages over other anticoagulants in current use. Dr. Cosgriff has also initiated a therapeutic pro-

gram with the employment of Vitamin K in small doses in patients undergoing anticoagulant therapy. By virtue of the "damping" influence of Vitamin K, the degree of hypoprothrombinemia is maintained in the safe therapeutic range in these patients for a considerable proportion of the treatment period. This seems to be advantageous in terms of safety since approximately 85 percent of the serious hemorrhagic complications occur at prothrombin time elevations above the upper limit of the safe therapeutic range. The ambulatory chronic anticoagulant therapy program has been continued and expanded, being of considerable value in patients with recurrent thromboemolic disease of a cardiac and peripheral nature.

Professor Joseph C. Turner and Dr. Betty Roof have continued a study of the metabolism of certain antirheumatic drugs. They have taken advantage of the intense fluorescence of gentisate to show that this drug is bound by connective tissue and are now engaged in an attempt to characterize the responsible tissue component and to analyze its relation to anti-inflammatory agents.

Dr. Richard J. Cross, Walter W. Palmer Fellow in medicine, has continued studies of the metabolism of ketone bodies, with special emphasis on the formation of these compounds in homogenates of rat liver and the effect thereon of the previous dietary history of the animal. It has been demonstrated that ketogenesis is appreciably greater with the livers of rats that have been fasted or fed a high-fat diet than with livers from carbohydrate-fed animals. After the induction of alloxan diabetes, increased formation of ketone bodies occurs even after high carbohydrate feeding. Studies have also been made of qualitative changes in the proteins and fats of the diet and the effect of such variations on the formation of ketone bodies by liver homogenates. Dr. Fernando Valenzuela, visiting fellow from Chile, has joined Dr. Calvin H. Plimpton in his investigations on the role of the parathyroids in the demineralization of bone in acidosis. Studies are also in progress on the mechanism of osteoporosis, especially in relation to cortisone. Professor Kenneth B. Turner is studying the electrophoretic pattern of lipoproteins in various conditions with particular emphasis upon arteriosclerotic heart disease.

Professor Alvan L. Barach has continued his studies on mechanically induced cough in collaboration with Drs. Gustav J. Beck, Hylan A. Bickerman, Louis A. Scarrone and Edward K. Williams. Exsufflation with negative pressure (E.W.N.P.), employed at the Presbyterian Hospital and in fifteen other clinics in over two hundred patients, was found an effective and at times a life-saving measure in cases in which elimination of retained pulmonary secretions had previously impaired respiratory function. The physiological effects of E.W.N.P. in those clinical entities, i.e., poliomyelitis, bronchial asthma, pulmonary emphysema, bronchiectasis, and postoperative pulmonary atelectasis, included a swift alleviation of respiratory and metabolic acidosis as a result of the high alveolar ventilation produced, the latter study being

carried out in collaboration with Professor Holaday of the Department of Anesthesiology. Elimination of mucopurulent secretions from postoperative patients by E.W.N.P., as opposed to such elimination by natural coughing, was unaccompanied by pain. This was explained by the fact that intra-abdominal and intra-pulmonary pressures in natural coughing were found to be far higher than those produced during E.W.N.P. It was also found that a greater safety factor in wound healing may be obtained by the use of E.W.N.P. rather than by natural coughing.

AT BELLEVUE HOSPITAL

In the Chest Service of Bellevue Hospital, twenty-two resident physicians have received training during the year. The instruction is mainly clinical in nature but also includes related subject matter, especially in pathology and physiology. Most of these physicians will enter practice in internal medicine and some will have teaching associations. A number of residents in training in thoracic surgery spent limited periods in the medical service. Forty-two interns spent from three to six months as part of their training in internal medicine. These interns are assigned not only from the Columbia Medical Service, but also from the Cornell and New York University Medical Services. In addition, there have been a number of observers and postgraduate students from various parts of the United States and foreign countries. The course for the fourth-year Columbia students has continued as usual.

Investigations of chemotherapy of tuberculosis under the direction of Professor J. Burns Amberson have been continued by Dr. Henry G. Shaffeld, Dr. Bettina B. Garthwaite, and Professor Marvin Kuschner, special attention being given to isoniazid. It has been demonstrated that following administration of this drug alone, bacterial resistance to it becomes manifest, in most cases within several months. It has also been confirmed that some of these resistant strains grown in vitro have little or no virulence for guinea pigs; nevertheless, there is evidence of a loss of satisfactory effect in human patients. This loss of virulence for guinea pigs was not observed with respect to streptomycin and para-aminosalicylic acid. Treated patients have been selected with the expectation that some would eventually require resection of diseased parts of the lung. The resected specimens have demonstrated on histological study almost complete resolution of exudative elements in sufficiently treated cases and this study has helped in determining the necessity of resection and its proper timing. In some specimens intact acid-fast bacteria are found, but these may fail to grow in culture or to infect guinea pigs. It is important to determine whether the organisms are dead or, if they are not, the nature of the change in their growth characteristics. Professor Julia M. Jones and Dr. Frances S. Lansdown have conducted a systematic study of the practicability of the home care of tuberculous patients receiving chemotherapy. The objective is to introduce some orderliness in the present con-

fusion surrounding this important question. The study relates not only to the proper selection of cases, but also to the suitability of home conditions. A group of patients is under such treatment and, in general, the plan is working satisfactorily. The importance of a close relationship between the outpatient clinic and the in-service is very evident. Drs. David S. Greenbaum and David G. Simpson, under the supervision of Professor Jones, are engaged in a study of the treatment of tuberculous pleural effusions with chemotherapy.

Professor André Cournand, Dr. Philip Samet, and Dr. Harry W. Fritts have continued their studies of blood volume in congestive heart failure, measuring both plasma and red cell volumes. They have confirmed preliminary observations that both red cell and plasma volumes are regularly increased in chronic right-sided congestive failure. The work is being extended to explore blood volume variations, both in disease and in various physiologic states, such as physical training and bed rest. Professor Cournand and Dr. Alfred P. Fishman have studied the validity of the Fick principle of determining cardiac output under various conditions, finding specifically that fifteen to twenty minutes of steady exercise is needed to establish a steady state both for oxygen consumption and for A-V difference. With Dr. Avard M. Mitchell they have explored the reported difference between the lactic acid concentration of pulmonary artery and of systemic arterial blood in congestive heart failure, and find that there is no such difference. Professor Cournand and Dr. Fishman have further studied the effects of anoxia and also of carbon dioxide inhalation on the pulmonary circulation. Carbon dioxide appears to have no direct effect. Anoxia appears to increase pulmonary arterial pressure both by increasing cardiac output and by increasing pulmonary vascular resistance. Professor Cournand, with Dr. Fishman and Drs. Richard and Mortimer Bader, have explored the effort or cost of pulmonary ventilation by measuring increased oxygen consumption. They have found greatly increased oxygen consumption and therefore increased work of breathing in various chronic pulmonary diseases, as well as in congestive heart failure. Drs. Fishman and Samet have studied the diminished ventilatory response to carbon dioxide as found in chronic pulmonary emphysema. They have found that prolonged use of the carbon dioxide anhydrase inhibitor, while lowering the levels of carbon dioxide in the blood, does not restore the sensitivity of the respiratory center to carbon dioxide. Dr. Fishman and Dr. Aaron Himmelstein have combined cardiac catheterization with bronchospirometry to study the blood flow through each lung separately. In preliminary experiments, they have found that anoxia in one lung does not appear to result in a shift of blood flow away from the anoxic lung. Professor M. Irene Ferrer and Dr. Rejane M. Harvey have continued their studies of circulatory dynamics in rheumatic mitral disease before and after commissurotomy. They have described a pattern of cardiac failure in this condition which is due to myocardial insufficiency rather than mitral valvular block, with evidence that such cases are not benefited by cardiac surgery. Professor

Ferrer and Dr. Harvey have studied the circulation in cardiac arrhythmias—specifically, atrial flutter and atrial fibrillation. The specific property of the circulation in these arrhythmias is relatively low pulmonary arterial pressures and pulse pressures, and low cardiac output, with a rise in cardiac output following digitalization.

Professor Richards, Dr. Richard T. Cathcart, and Dr. William W. Field have published the results of a comparative study of cardiac output as measured by the direct Fick procedure and as measured by the low frequency ballistocardiograph. There is not a satisfactory correlation of the ballistocardiographic measurements with the direct Fick measurements. Professor Cournand, Professor Amberson, and Dr. Fishman have continued their physiologic studies of the effects of antibiotics in tuberculosis. Disturbed physiology in acute exudative tuberculosis is restored nearly to normal following successful antibiotic therapy.

The teaching schedules for fourth-year students and the course in physical diagnosis for the second-year students have continued without significant change. The use of heart models has been added to the instruction under Dr. Fishman. A series of evening conferences for the house and resident staff of Bellevue Hospital has been carried on during the year under Professor Richards, Dr. Fishman, and Dr. Gerard M. Turino.

AT GOLDWATER MEMORIAL HOSPITAL

The Research Service at the Goldwater Memorial Hospital is now in its eighteenth year as an affiliated unit engaged in the study of chronic disease. It is gratifying to report that the University and the city of New York entered into a contract on March 1, 1954, which will assist in stabilizing the financial support of the unit. The Goldwater Hospital Annex (the former City Home Laboratory has been renovated and is now occupied by several members of the Research Service. This has made possible an expanded program in the field of hypertension. Professor Quentin B. Deming, a Markle Scholar and formerly assistant professor of medicine at Stanford University, joined the staff on September 15, 1953, to take a major part in the investigation.

Professor Forrest E. Kendall and Professor Margaret Bevans of the Department of Pathology are continuing their studies on the factors which influence the regression of induced canine atherosclerosis. They have shown that the long-term administration of estrogens to either male or female dogs in which atherosclerosis is being produced by excess dietary cholesterol and thiouracil does not significantly influence the serum lipid patterns or the rate of development or regression of the arterial lesions. Dr. Erwin H. Mosbach has completed his studies on the separation and identification of bile acids by column partition chromatography. He has developed a method for the simultaneous quantitative determination of cholic acid and desoxycholic acid by ultra-

violet absorption spectrophotometry. He has devised improved procedures for the synthesis of the 7-oxygenated cholanic acids and has shown that these substances can be separated and identified by partition chromatography. In collaboration with Dr. Seymour Dayton, he has studied the nature of certain radioactive contaminants in biosynthetic cholesterol (C^{14}) and has given special attention to a number of compounds related to cholesterol as sources of this contamination. In conjunction with Dr. John J. Burns of the New York University Research Service, Goldwater Memorial Hospital, Dr Mosbach has investigated the turnover of vitamin C in the rat. It was found that the increase in urinary ascorbic acid which follows the administration of choloretone or of barbiturates is due to an increased biosynthesis of this vitamin. Dr. Liese L. Abell and Dr. Mosbach have carried out cholesterol-balance studies in dogs. They have shown that in euthyroid, hypothyroid, and hyperthyroid animals on high cholesterol diets, more than 50 percent of the ingested cholesterol is metabolized to substances other than sterols or bile acids. Cholesterol-4-C^{14} is now being utilized to investigate possible alternative pathways of cholesterol metabolism in the dog. Drs. Dayton and Mosbach are studying the origins of biliary cholesterol and bile acids. Dr. Dayton has shown that normal rats receiving continuous infusions of tracer amounts of C^{14} labeled acetate oxidize 70 percent of the acetate of CO_2 while converting 1 percent to cholesterol and 12 percent to fatty acids. The techniques employed permit quantitation of certain other metabolic functions; normal rats were found to turn over endogenous acetate at the rate of 11 mM/100 gm. body weight in twenty-four hours, and to synthesize cholesterol and fatty acids from acetate at respective rates of 3.4 and 40 mg./100 gm. in twenty-four hours. Only 15 percent of the animal's respiratory CO_2 was found to be derived from acetate. The experiments have been extended to a study of the influence of thyroid activity on these metabolic functions. Professor Alfred Steiner and Dr. Dayton are investigating the effect of a high-fat, cholesterol-free diet on the serum lipid pattern and arterial system of the rabbit. Professor Steiner and Dr. Mathers were unable to demonstrate that the long-term administration of either choline, inositol, methionine, or tween 80 influenced favorably the abnormal serum lipid pattern or cardiac pain of patients with coronary atherosclerosis. Professor Steiner, Dr. Henry A. Payson, and Professor Kendall have found that feminizing dosages of an estrogenic hormone cause the abnormal serum lipid pattern of certain male patients with coronary atherosclerosis to shift towards normal. The occurrence of angina pectoris and abnormal electrocardiographic findings were not influenced by the administration of the estrogens. Dr. Henry A. Lax, Dr. Arthur W. Feinberg, and Mr. James F. Blake are continuing their studies of the arterial pulse wave as recorded by the strain-gauge transducer vasculograph. Characteristic reproducible deviations from the configuration of the normal arterial pulse wave have been noted in individuals with presumable peripheral arteriosclerosis. In collaboration

with Professor Bevans and Professor Kendall, similar changes are being observed in adult dogs in whom atherosclerosis has been produced by the ingestion of excess cholesterol and thiouracil.

Professor Arthur R. Wertheim and Dr. Gerald H. Eurman have completed their study of glucose tolerance curves and simultaneous serum phosphate changes in healthy man and in patients with hypertension. They report that some patients with primary hypertension have less of the expected fall in serum inorganic phosphorus than do normotensive controls. Dr. Albert J. Stunkard, Dr. Eurman, Dr. Morton Wachspress, and Professor Wertheim have reported the results of a study of the effects of hydralazine in twenty-five hospitalized patients with hypertension. The administration of this drug produced a significant reduction in blood pressure in seventeen of the twenty-five individuals observed. A comparison of the over-all therapeutic effect of hydralazine with that produced by a low-sodium diet (90 mg. Na daily) suggests that the latter regimen is more beneficial. Professor Deming, Dr. Arthur R. Schulert, Dr. Wachspress, Dr. Seta M. Torosdag, Professor Wertheim, and Professor David Seegal are engaged in an appraisal of a number of drugs which have been proposed for the treatment of hypertension. Dr. Schulert and Mr. Burton J. Palmer are developing methods to investigate the physiological disposition of the drugs under trial. In cooperation with the New York University Research Service, Dr. Stunkard with Dr. Walter Redish and Dr. Lothar R. Wertheim have studied the effects of hydralazine in individuals with transected spinal cords and in subjects with surgically induced sympathectomy. Their findings indicate that the intact sympathetic nervous system is unnecessary for the effective action of the drug. This observation has led them to suggest that hydralazine may act directly on the peripheral blood vessel.

Professor Beatrice C. Seegal of the Department of Microbiology and Professor Bevans have extended their studies on the nephritis produced by specific anti-kidney serum in the rat and dog. They have demonstrated that the much-discussed latent period prior to the development of nephritis which follows the ingestion of duck anti-rat kidney serum into rats is related to the low titer of the serum. Utilization of a high-titered serum results in immediate nephritis. Decreasing dosages of the same serum brings about the latent period. Cortisone did not prevent the immediate cytotoxic nephritis or that form which develops after a latent period. In collaboration with Professor Ragan, Dr. Judith Nadell, and Dr. Felix E. Demartini, Professor Bevans has reported on a fulminating, disseminated form of rheumatoid arthritis. Professor Arthur J. Patek, Jr., with Dr. Ernest Schmatolla, Mr. Saul I. Cohen, and Professor Bevans, is carrying out studies to determine more precisely the dietary factors involved in the recovery from nutritional cirrhosis in rats.

Employing the device developed by Professor Barach, which combines exsufflation with negative pressure to produce mechanical coughing, Dr. Hylan A. Bickerman and Miss Sylvia E. Itkin have demonstrated the elimina-

tion of viscid mucin-thorotrast mixtures and foreign bodies from the bronchi of anesthetized dogs. The effects of this procedure are being studied in patients with pulmonary emphysema and bronchiectasis. Dr. Bickerman has described a method for producing a consistent cough reflex in normal subjects by means of inhaled irritants in the form of citric acid aerosols. This method has been employed in the evaluation of a number of antitussive agents. Dr. Bickerman, with Professors Bevans and Barach and Miss Itkin, has demonstrated that exposure to low O_2 tension has retarded tumor growth in mice implanted with Sarcoma 180 and Line I leukemia. Dr. Louis A. Scarrone and Dr. Ralph Levin have studied the change in vital capacity produced by varying the speed of expiration. No significant variation was found in sixty-five normal subjects but a marked decrease in vital capacity occurred with rapid expiration in thirty patients with bronchial asthma and in sixty-seven patients with pulmonary emphysema. The effect of varying O_2 concentration on the pulmonary ventilation of normal and emphysematous subjects is being studied.

In a cooperative study with the Public Health Research Institute of the City of New York, Inc., utilizing N^{15} glycine, Professor DeWitt Stetten, Jr., Mrs. Jean D. Benedict, Miss Helen J. Kalinsky, and Drs. Scarrone and Wertheim have found that the creatinuria of patients ill with progressive muscular dystrophy appears because creatine formed in the liver is not utilized by the skeletal muscles. It was also found that the glycine pool in these patients is not homogeneous.

AT FRANCIS DELAFIELD HOSPITAL

Professor Alfred Gellhorn has continued investigations on the mechanism of action of anti-tumor compounds. The phase of nucleic acid biosynthesis inhibited by 9-azaguanine was more precisely localized by metabolite reversal experiments and evidence was obtained in collaboration with Professor Murray to indicate that a metabolite of 6-mercaptopurine may be important therapeutically. Together with Dr. Erich Hirschberg and Professor Jack D. Davidson, Professor Gellhorn has been participating in an interinstitutional collaborative program which is charged with the evaluation of cancer chemotherapy screening methodology. In Professor Gellhorn's laboratory studies are in progress to determine the importance of tobacco tar as a cocarcinogenic agent.

Professor Davidson has continued his studies on the influence of drugs upon the rate of incorporation of radioactive inorganic phosphate into nucleic acid tumors. His principle finding is that not all tumor-inhibiting compounds depress this rate, but that no compound was found to have this depressant effect without also being inhibitory on tumor growth.

Dr. Elliott F. Osserman has been engaged in a comprehensive study of serum and urine proteins in a variety of pathological states, particularly in neoplastic disease, using the technique of paper electrophoresis. The method

has been modified and adapted for routine use in serum protein analysis of patients at Francis Delafield Hospital. Dr. Osserman found in twenty-five consecutive cases of multiple myeloma that the serum or urinary patterns were diagnostic in all patients, with no false negative or false positive results.

Dr. George A. Hyman has defined the usefulness of bone marrow aspiration in the detection of osseous metastases not demonstrable by X-ray examinations. In sixty-six patients who were found to have tumor cells in marrow aspirates, 25 percent failed to show skeletal involvement by X ray. This has become a routine procedure at the Delafield Hospital in the preoperative evaluation of patients with breast and lung cancer. Utilizing the Ashby technique, Dr. Hyman has shown that the life span of normal erythrocytes is shortened in cancer patients with disseminated disease. These studies, together with observations using radioactive iron which has shown an increased rate of erythropoiesis in these patients, has led to the conclusion that hemolysis is an important factor in the anemia of cancer.

Professor Gellhorn and Dr. James F. Holland completed an evaluation of dihydrotestosterone in advanced breast cancer which failed to confirm claims that this steroid was superior to testosterone propionate. The members of the Medical Service at the Francis Delafield Hospital have also conducted a critical evaluation of 6-mercaptopurine in a variety of neoplastic diseases which has indicated that the chief value of the drugs is in acute leukemia of children.

DEPARTMENT OF MICROBIOLOGY

Professor Harry M. Rose, Executive Officer

Ten graduate students were registered in the Department of Microbiology under the Faculty of Pure Science and one student, Joseph Portnoy, completed requirements for the Ph.D. degree. Dr. Portnoy is now in charge of the Venereal Disease Research Laboratory at the Communicable Diseases Center, United States Public Health Service, Atlanta.

Professor Dan H. Moore transferred his affiliation from the Department of Anatomy to the Department of Microbiology. His special knowledge and interest in biophysics have been an invaluable asset during the past year.

Dr. Sam M. Beiser and Dr. Stuart W. Tanenbaum received appointments as associates; they have greatly strengthened the teaching and research program in bacterial genetics and bacterial metabolism. Dr. Isabel Morgan Mountain was appointed research associate assigned to the Department of Pediatrics, where she collaborated with Professor Hattie E. Alexander on studies of poliomyelitis. Dr. Councilman Morgan was appointed instructor in medicine assigned to microbiology. Dr. Morgan is occupied with electron microscopy as a field of biologic research. Dr. Marlene H. G. Friedlaender was appointed associate. Dr. Friedlaender's major interest is biophysics, including electron microscopy.

Dr. Sidney Leskowitz resigned as research assistant to accept the position of assistant immunologist at the Vincent Memorial Hospital, Boston, and research associate at the Harvard Medical School.

Professor Harry M. Rose and Professor Beatrice C. Seegal presented papers at the Sixth International Congress for Microbiology in Rome, Italy. Numerous outside lectures were given by members of the department.

The laboratories of the diagnostic service performed 70,259 examinations, of which 29,432 were serologic tests for syphilis. An outstanding feature of this work—which again set an all-time record in the number of examinations performed—was the great increase in tests for the sensitivity of bacteria to antibiotics.

Professor Rose continued studies, in collaboration with Dr. Bernard F. Erlanger, Dr. Calderon Howe, and Dr. Morgan, of anti-viral substances in secretions of the human respiratory tract.

Professor Claus W. Jungeblut continued his studies on poliomyelitis. Further investigation, carried out with Dr. Harriet Danforth at the Elizabeth Kenny Institute, Minneapolis, on the occurrence of a receptor-destroying enzyme in human saliva, confirmed the earlier observation that the enzyme was present more frequently and more consistently in poliomyelitis patients examined either in the acute phase or during convalescence than in healthy persons. Extensive studies on the distribution of the enzyme in family units, based on data collected from over 130 families in Westport, Connecticut, suggest that the presence of the enzyme is inherited as a dominant gene. The same conclusion was reached by Dr. Nash Herndon who collaborated with Professor Jungeblut on similar studies at the Bowman-Gray School of Medicine in Winston-Salem, North Carolina. Continuing the work on the in vitro adsorption of poliomyelitis virus on human red cells, it was found that strains belonging to types I and II are adsorbed on O erythrocytes, as was previously shown with type III virus. These studies were carried out with Dr. Bartheld Hofman, Jr. In studying the susceptibility of various species of Central or South American monkeys to infection with poliomyelitis virus, it was found that spider monkeys are readily paralyzed by intracerebral injection of type I poliomyelitis virus and by Col-SK virus but are completely refractory to intracerebral injection of type II and type III poliomyelitis virus; this work was carried out in collaboration with Dr. Enid de Rodaniche at the Gorgas Memorial Laboratory, Panama.

Visiting Professor Leon Dmochowski continued his studies of the properties of the agent responsible for mammary carcinoma in mice. Bio-assays were carried out to obtain information as to whether milk or spontaneous tumor tissue of RIII agent-carrying mice is a better source of the agent. The results obtained thus far indicate that milk is superior to tumor tissue in this respect. Casein and lipoprotein fractions were obtained from milk by means of differential centrifugation and assayed for the agent; the casein fraction has already shown greater tumor-inducing activity than the lipoprotein fraction,

but final assessment of the difference between them must await conclusion of the biologic tests. In collaboration with Professor Moore, fractions showing particles 300 A° in diameter in the electron microscope were obtained electrophoretically from RIII agent-carrying tumors and were bio-assayed in an attempt to confirm previous observations of the high activity of such fractions. Biologic tests of various fractions obtained from milk and tumor tissue by differential centrifugation indicated that the small microsome fraction containing particles of 300 A° average diameter is the most active one. Electron microscopy of 23 high and 21 low-cancer-strain mammary tumors from several strains revealed the presence of spherical particles from 500 A° to 1500 A° in diameter in the majority of the high and in some of the low-cancer-strain tumors. Experiments carried out in collaboration with Professor Michael Heidelberger of the Department of Medicine, showed that anti-RIII agent rabbit serums absorbed with preparations from agent-free milk still gave strong precipitation with the milk agent preparations, indicating that there is some antigen present in the milk factor preparations which is absent from the agent-free milk from the same strain of mice.

Professor Moore continued collaborative work with Professor Cushman D. Haagensen of the Department of Surgery and Professor Dmochowski on the mouse mammary milk agent. He also collaborated with Professor Rose, Dr. Solon A. Ellison, Dr. Morgan, and Dr. Friedlaender on electron microscopic studies of viruses and of tissues.

Professor Beatrice C. Seegal, in association with Professor Margaret Bevans of the Department of Pathology and Mrs. Margo Hasson, studied nephritis produced in rats by duck anti-rat kidney serum. It has been demonstrated that the reported latent period of nephritis, which is said to occur following the injection of nephrotoxic serum prepared in the duck, is related to the low titer of the serum. Utilization of a high-titered serum results in immediate nephritis. Smaller doses of the same serum induce nephritis only after a latent period. Cortisone failed to prevent either of these types of nephritis. In studies attempting to produce atherosclerosis in the normally resistant rat, animals in which nephritis was produced by specific nephrotoxic serums were placed on high-cholesterol diets. Atheromatous lesions have not yet been observed, although calcific lesions of the media of arteries were produced. Investigation of the specific types of hemolytic streptococci associated with acute glomerulonephritis in man continued to indicate a preponderance of type 12.

Professor John D. MacLennan continued his researches on the proteolytic enzymes of *Clostridium histolyticum*. More satisfactory methods for fractionation were developed and, in addition to the collagenase and protease already studied, three new peptidases were identified. In association with Dr. Calderon Howe, an investigation of an enzyme capable of hydrolyzing blood group A substance was begun. This enzyme is produced by *Cl. tertium* and important data were obtained on the conditions necessary for its optimal production.

Dr. Margaret Holden continued and enlarged her investigation of the effect of cortisone and related steroids on cells in vitro. The physiologic performance of cultured cells in the presence of steroids was observed to supplement the histologic data already gathered. Various types of cells were studied for their phagocytic and mitotic activity in the presence of steroids.

Dr. Ellison continued studies of infections caused by the virus of herpes simplex and, in collaboration with Dr. Erlanger, extended investigations of the chemical reversal of the effects of ultraviolet irradiation on bacteria. Evidence was obtained that both the lethal and mutagenic effects of ultraviolet irradiation on *Escherichia coli* may be reversed by acetate, and that visible light acts synergistically with acetate in the reactivation of bacteria following their exposure to ultraviolet light. Dr. Ellison joined Professor Rose, Professor Moore, and Dr. Morgan in electron microscopic studies on the structure and development of animal and bacterial viruses. Dr. Sam M. Beiser also assisted in the work on the latter agents. Drs. Ellison and Beiser organized and conducted a course in laboratory techniques used for the study of bacterial viruses which was taken by the graduate students and several members of the staff.

Dr. Howe continued his work in association with Professor MacLennan on a polysaccharidase from *Clostridium tertium*. Using media based on an enzymatic hydrolyzate of casein, optimal conditions for the growth of the organism were established and production of polysaccharidase was found to be dependent on the presence of either whole blood group substance, or glucosamine, a constituent of blood group substance. The enzyme was found to attack blood group A substance specifically, as determined by its action on soluble blood group substances as well as on intact human erythrocytes. The action of the enzyme also caused erythrocytes, regardless of blood group, to become panagglutinable by human serum and to lose agglutinability by Columbia SK virus, although agglutinability by influenza virus was not lost. Work is in progress to determine the split products resulting from enzymatic digestion of soluble hog blood group substances as well as of concentrated human erythrocyte stroma fractions. Purification of the enzyme itself is also under study, using ammonium sulfate and methanol fractionation procedures. In collaboration with Professor Rose and Dr. Erlanger, studies on the relationship of blood group substances and viral inhibitors were continued. In the course of this work, serums from individuals of group O immunized with either A or B substances, were found to show evidence of linked antibody to both the A and B antigens. These observations were extended on the basis of quantitative immunochemical procedures.

Dr. Erlanger initiated studies on the mechanisms of action of peptide antibiotics, particularly gramicidin S and related synthetic peptides. It was found that the synthetic "straight chain" decapeptide having the same sequence of amino acids as gramicidin S has antibacterial activity, and evidence was obtained that certain derivatives of this decapeptide may be as active as gramicidin S itself. The characteristics of proteolytic enzymes present in cell-free

extracts of *Bacillus brevis* (the microorganism which produces gramicidin S) were investigated with the purpose of determining the mode of biosynthesis of this unusual peptide. A new method for the synthesis of amino acid benzyl esters was developed; these derivatives are important intermediates for peptide synthesis. In collaboration with Professor Rose and Dr. Howe, the investigation of antiviral factors in human sputum was continued. Studies were begun on the possible antiviral properties of a large number of synthetic peptides. In association with Dr. Beiser and Professor Seymour Lieberman of the Department of Obstetrics and Gynecology, the synthesis of a compound containing forty testosterone molecules per molecule of bovine serum albumin was achieved. This compound is electrophoretically homogeneous and distinct from unsubstituted serum albumin. When injected into rabbits it elicited antibody response specific for the conjugated protein. The conjugated protein and the antibody are being studied further. Investigation of the chemical reactivation of ultraviolet irradiated bacteria was continued with Dr. Ellison and Mr. Peter Allen, a graduate student.

Dr. Robert H. Muller extended his studies on the concentration and partial purification of the Lee strain of influenza virus by means of ion exchange resins. Experiments indicated the possibility of separating the hemagglutinative and infective components of the virus, and fractions were obtained in which one or the other predominated, but a complete separation was not effected. In electron photomicrographs of the preparations the virus particles appeared as flattened spheres. There was no evidence that the virus particles were split by the resin treatment into smaller components.

Dr. Councilman Morgan, in association with Dr. Ellison, Professor Moore, and Professor Rose, conducted electron microscopic studies of thin sections of tissues infected by viruses. Herpes simplex, vaccinia, fowlpox, and influenza viruses were found to possess a characteristic internal structure of unsuspected complexity. The technique permits detailed study of sites of viral development in the host cell and is affording new information about the manner of viral differentiation. It is believed that these new methods, gradually improved during the past year, will clarify important problems of viral structure and virus-cell relationships which have to date resisted less direct attempts at their solution.

Dr. Beiser collaborated with Dr. Tanenbaum in a study of gene-enzyme relationships using the dehydroquinic dehydrogenase of *Escherichia coli*. In preliminary experiments on the specificity of this enzyme from the wild-type strain, and from the temperature-sensitive and "complete-block" mutants, the enzymic activity was concentrated by fractional salt precipitation. In attempting to prepare phage-infected bacteria for electron microscopic examination, difficulties were encountered which were due to the lack of information concerning the latent period of phage-infected bacteria on solid media. A new technique was developed with Dr. Ellison for this measure-

ment and was extended to the determination of the latent periods of the T series of phages of *E. coli.* Anti-hormones were investigated in collaboration with Dr. Erlanger and Professor Lieberman. Testosterone was chemically coupled to bovine serum albumin, and this compound was used to immunize rabbits. Antibodies specific for testosterone albuminate were obtained, and a study of the biological effects of these antibodies is contemplated. The biologic role of desoxyribonucleic acid (DNA) in pneumococcal transformation reactions was investigated. Studies on atypical transformation in pneumococci, begun at the Rockefeller Institute, were continued. In addition, fractionation of the various transforming activities in DNA was attempted in collaboration with Dr. Aaron Bendich of the Sloan-Kettering Institute and Dr. Rollin D. Hotchkiss of the Rockefeller Institute. The possibility that DNA might be antigenic was also studied with Dr. Sidney Leskowitz. Rabbits were injected with pneumococcal DNA, and the effect of the serums from these animals on the transformation reaction was investigated.

Dr. Tanenbaum, with Dr. Harry Katznelson of the Canadian Department of Agriculture, investigated sugar oxidations in the genus *Acetobacter.* Experiments with two strains of *A. melanogenum* indicated that maltose oxidation follows the pathway: maltose → glucose → gluconic acid → 2-ketogluconate → 2,5-diketogluconate. No evidence was obtained for the formation of 5-ketogluconic acid in these transformations. Oxidations with intact cells and with cell-free preparations demonstrated that noninducible enzymes are concerned. It is suggested that the course of maltose catabolism involves a simple hydrolysis to glucose prior to oxidation, rather than a mechanism which would invoke phosphorolysis or direct attack at the disaccharide level. The responsible enzymes in the oxidative metabolism of *A. melanogenum* were obtained in a cell-free state by sonic disintegration. Glucose, gluconic, 2-ketogluconic, alcohol, and lactic dehydrogenases were found to be present. The ease with which these active enzyme extracts can be prepared should open the way to their further characterization. *A. melanogenum* does not attack tricarboxylic acid cycle intermediates and hence appears to lack this terminal oxidative pathway. For comparative purposes, the relationship between superficial substrate dehydrogenation to energy transfer has also been investigated with *A. rancens.* This organism, in contradistinction to *A. melanogenum,* has the elements of a terminal dicarboxylic acid cycle. In conjunction with Dr. Beiser, an approach was made toward the study of gene-enzyme relationships using the dehydroquinic dehydrase system of *E. coli.*

Dr. Alice W. Knox completed experiments carried out during the last two years on a factor in human saliva which destroys the virus-receptor substance of erythrocytes. The results suggest that the salivary factor which inhibits the hemagglutination of erythrocytes by Col-SK virus, and at the same time causes them to become panagglutinable, occurs more frequently and more consistently in poliomyelitis patients than in normal individuals.

DEPARTMENT OF NEUROLOGICAL SURGERY

Professor J. Lawrence Pool, Executive Officer

Professor Pool continues his interest in psychosurgery, stimulation of the brain by implanted electrodes, treatment of Parkinson's disease by litigation of the anterior chorioidal artery, and treatment of glioblastoma by biochemical as well as by surgical and X-ray treatment.

Dr. James B. Campbell is carrying on projects on stereotaxic placement of radioactive materials for the production of quantitated lesions in the brains of animals and the innervation of the urinary tract from the urethra to the renal pelvis in animals.

Professor Lester A. Mount has continued his investigation of collateral circulation of the brain in cases of intracranial aneurysms and other conditions.

Professor Edward B. Schlesinger is carrying out a study of anatomical variations of the spinal canal in cases of ruptured intervertebral disc, and is investigating new muscle relaxant drugs.

Dr. Thomas J. Bridges continues his work on studies of intracarotid infusion of azoguanazola for treatment of glioblastoma (malignant brain tumor) and studies of intracerebral pressure and circulatory changes accompanying sympathetic nerve stimulation by a new plethysmographic technique.

Dr. Joseph Ransohoff's research activities include psychosurgery, in collaboration with members of the staff of the Department of Psychiatry, with particular emphasis on the immediate effects of lobotomy on psychotic patients operated upon under local anesthesia, and localization and connections of areas in the brain dealing with consciousness and autonomic functions. He is conducting studies of by-passing operations for the treatment of obstructive hydrocephalus.

Dr. Hubert L. Rosomoff has conducted elaborate experiments dealing with the circulation in the brain and with brain surgery under conditions of extreme cold with a view to practical application of this technique to human brain surgery for intracranial aneurysms and vascular tumors.

Dr. Dominick Purpura has been carrying out cathode-ray recordings of cerebral activity of cats on stimulating sensory nerves and pathways. This work has contributed to new theoretical and practical considerations of sensory activation and representation in the cerebral cortex.

Dr. William K. Clark has been active with Professor Pool in studying the beneficial effect of deep electrical stimulation of the animal and human brain for pain relief by means of implanted electrodes.

Drs. Frank L. Hudson and Arthur A. Pava have participated with Dr. Campbell in work on the innervation and controlled electrical stimulation of

the urinary bladder with the ultimate aim of application to humans suffering from impaired bladder control.

Sir Geoffrey Jefferson of Manchester, England, presented a lecture to the Neurological Institute staff on trigeminal nerve tumors.

DEPARTMENT OF NEUROLOGY

Professor H. Houston Merritt, Executive Officer

Clinical research by members of the resident staff included a study of the result of therapy in myasthenia gravis by Dr. Lewis P. Rowland, the relationship of syringomyelia and tumors of the spinal cord by Dr. Charles M. Poser, and the reduction of the sugar in the cerebrospinal fluid of patients with neoplastic diseases of the meninges by Dr. Leonard Berg. Dr. Robert Fishman is studying the effects of transplantation of the embryonic thymus gland, and Dr. James Austin the exchange of protein in the cerebrospinal fluid by the use of labeled carbon atoms.

Dr. Eli Goldensohn, who had been a fellow in 1949–1950, returned to the department as assistant professor. From October 1, 1953, to March 31, 1954, Professor Paul F. A. Hoefer was on sabbatical leave as an exchange professor at the Free University of Berlin. During this time Professor Goldensohn was in charge of the electroencephalographic laboratories.

The refractory period and electromyographic patterns in normal subjects and in patients with myopathies is being studied by Professor Hoefer in collaboration with Dr. Christian Hermann, Dr. Thelma Estrin, and Leonard Zablow. Professor Goldensohn is studying the interrelationship between the medullary areas in cerebral cortex. Dr. Sidney Cohen, working with Professor J. Lawrence Pool of the Department of Neurological Surgery and Professor Hoefer, has been able to devise a valid method for the recording of discharges from individual cells in the motor cortex of the cat.

Professors Sidney Carter and Daniel Sciarra and Dr. Melvin D. Yahr have continued their work with patients with convulsive seizures. Several new compounds were given a clinical trial. One of these, mysoline, was found to be of value in the treatment of some of the patients whose seizures were refractory to other forms of therapy. Dr. Frederic Zimmerman has studied the effect of various compounds on the petit mal seizures of children. One new compound, milontin, has been found to be quite effective and has the additional advantage of low toxicity. Professor William Caveness, who returned after two years in the United States Navy, is conducting an extensive study of the pathogenesis of convulsions with particular reference to the effect of sleep on the electrical activity of the cerebral cortex. Professor Caveness is also in charge of a follow-up study of military personnel who sustained head wounds in the Korean campaign. Dr. James H. Brown has been awarded a

clinical fellowship to assist Professor Caveness in this study. Professor Caveness has made a study of public attitudes toward epilepsy in collaboration with Dr. George Gallup. The results of these studies indicate an increase in the enlightenment of the public in regard to this disease.

Dr. Lewis Doshay continues his studies of Parkinson's disease. With the aid of Professor Frederic J. Agate of the Department of Anatomy, attempts are being made to quantitate the degree of rigidity and tremor in these patients and to test the effects of various drugs on these symptoms.

Dr. William Amols has been studying the effect on abnormal movements of various compounds with curare-like action and the effect, on the emotional state or on the mood, of compounds which stimulate the central nervous system. One compound, thorazine, which was introduced in France as a central nervous system stimulant was found to be relatively ineffective in altering the mood of patients but has been very effective in the control of vomiting. Studies of this compound by Professor Shih-Chun Wang of the Department of Physiology indicate that it acts directly on the chemo-receptors in the floor of the fourth ventricle which controls emesis.

In their studies on the immunochemistry of the blood group substances, Dr. Sidney Leskowitz and Professor Elvin A. Kabat have developed a method for the quantitative separation and determination of glucosamine and galactosamine in mixtures. With this method differences in the ratios of glucosamine to galactosamine in the hog and human blood group A, B, and O substances have been found; hog and human A substances have ratios averaging 1.5, hog O substances 2.2, and human B substances 2.8. On mild acid hydrolysis, labile oligosaccharide fragments are split off and the ratios of glucosamine to galactosamine for the hog and human A substances average 2 to 4, the hog O substances 13 to 14; only glucosamine was split off from the human blood group B preparations. These are the first chemical differences found which correlate with blood group activity; blood group substances from cattle and horse stomachs appear to show species rather than blood group specificity in their glucosamine-galactosamine ratios and behavior toward mild acid hydrolysis. Dr. Sidney Leskowitz has resigned to accept a position as research associate at Harvard and assistant immunologist at the Vincent Memorial Hospital in Boston beginning July 1, 1954.

Dr. Calderon Howe and Professor John D. MacLennan of the Department of Microbiology, in collaboration with Professor Elvin A. Kabat, have been studying the behavior of several bacterial enzymes which split blood group substances. Dr. Mary Carsten and Professor Kabat have begun a study of the amino acid composition of the blood group substances.

Studies on the immunochemistry of dextran and other polysaccharides which are antigenic in man are also continuing. Professor Kabat has studied the effects of oligosaccharides of various sizes in inhibiting the precipitation of human anti-dextran by dextran. From these studies, Professor Kabat in-

ferred that the combining site on an antibody molecule has dimensions complementary to at least a trisaccharide and probably to a tetrasaccharide.

Dr. Carsten and Professor Kabat have been studying the binding of oligosaccharides with anti-dextran by equilibrium dialysis with a view to determining the association constants and free energy of the combination of oligosaccharide and antibody. Mr. Peter Allen, a graduate student in microbiology, and Professor Kabat have completed a study of the precipitin reaction of various anti-dextrans and dextrans.

Dr. John H. Vaughan, now assistant professor of medicine at the Medical College of Virginia, and Professor Kabat have studied antisera to conalbumin and egg white and have shown that the skin-sensitizing capacity of these antisera is due to the presence of antibody to undefined minor constituents of egg white. Using the agar diffusion technique, an additional component of egg white constituting less than 1 percent of the total protein has been studied. This substance contaminates crystalline egg albumin but is absent from crystalline conalbumin.

In collaboration with Professor Abner Wolf and Dr. Mavis Kaufman, Professor Kabat and Miss Ada E. Bezer are completing a study of the effect of incorporating various substances into the adjuvant mixture on the production of acute disseminated encephalomyelitis in rhesus monkeys.

The immunochemical determinations of gamma globulin in cerebrospinal fluid are being carried out by Mr. Charles Peterson. Multiple sclerosis patients who have had repeated determinations of cerebrospinal-fluid gamma globulin are being followed by Dr. Melvin D. Yahr and Professor Kabat in an effort to correlate the level of cerebrospinal-fluid gamma globulin and the course of the disease.

Professors Abner Wolf and David Cowen are continuing their studies on the effect of maternal infection with toxoplasma and viruses on the developing embryo.

Investigations of the fundamental mechanisms of bioelectric potentials were carried forward in the past year by Professor Harry Grundfest and his associates. Studies of the bioelectric alterations produced by microinjection of ions and drugs into giant axons of squid were made in an extensive series of experiments with Dr. Mario Altamirano, Dr. C.-Y. Kao, Professor Robert Post of the Vanderbilt University Medical School, and with the technical assistance of one of our students, Mr. Donald Watts. Alteration of the internal ionic environment with respect to K^+ has relatively little effect on bioelectric potentials. Increase of internal Na^+ rapidly causes alterations in form and amplitude of the spike. Various organic and inorganic anions have also little effect on either resting or action potential. The divalent cations, however, are extremely potent, acting in small concentrations to abolish the spike and to depolarize.

Professor Alexander Mauro of the Yale University School of Medicine,

who has been working as a guest of this department, succeeded in demonstrating that a resting potential is recorded with reversible Ag-AgCl electrodes inserted into a giant axon. The results confirm the findings obtained in microinjection experiments that the resting potential is not a Donnan potential. These investigations have disclosed the need for revision of the theory of the resting potential and a new hypothesis has been put forward.

Another series of experiments, in which as many as three microelectrodes were inserted into a single axon, demonstrated that the form of the spike is independent of a number of electrical circuit conditions and that the form may be altered in a small region of nerve by localized injections of Na^+.

Studies of impedance changes of the squid giant axon were continued by Professor Grundfest and Mr. E. Amatniek, Dr. Geraldine Kiebler of New York University, and Drs. A. M. Shanes and W. Freygang, Jr., of the National Institutes of Health. Alteration of the K^+ content of the external medium alters very markedly the form of the impedance changes of activity. This work resulted in discovery of the "initial after-impedance." The recent work has established some of the properties of this component.

The specialized type of bioelectric generator found in electroplaque of the electric eel has been further studied in experiments by Professor Grundfest, Dr. Mario Altamirano, Professor David Nachmansohn, and Dr. C. W. Coates of the New York Aquarium. These cells possess two types of excitable mechanisms. One is capable of being activated only by nerve impulses while the second is also electrically excitable and itself has two distinguishable components. The electroplaque preparations developed in these studies, with innervation intact, possess a number of properties which are analogous to neuronal complexes and are thus capable of serving as an experimental model for many types of synaptic systems. The finding of different types of excitable systems has made possible a study of the action of various drugs. Some drugs are found to affect primarily the neurally excitable component while another group affects primarily the electrically excitable system. Other members of the family Gymnotidae, of which the electric eel is a member, also possess electric organs. Three species were found to produce continuously, unlike the electric eel, extremely regular electrical discharges. In one species the frequency of the discharges was as high as 300 per second. These are under control of the nervous system, but their function is as yet unknown.

An extensive study of the spinal afferents to the cerebellum was carried out by Dr. Raul M. Carrea of Buenos Aires with Professor Grundfest. The origin, location, and termination of the ventral spino-cerebellar tract in cats and monkeys has been characterized electrophysiologically. Professor Fred A. Mettler and others have characterized the location and properties of the descending limb of the cerebellum. The study of the action of various dental anesthetics by means of the plethysmographic technique is being continued by Professor Grundfest in cooperation with Drs. Joseph E. Fiasconaro and Harold Sherman of the School of Dental and Oral Surgery.

Professor David Nachmansohn continued to investigate the molecular forces in the active surface of the proteins of the acetylcholine system. Since it has been established that this system is an integral part of the mechanism by which nerve impulses are conducted, a detailed study of the properties of the proteins promised to yield information useful for the physiology and pharmacology of the nervous system. The development of the last year has borne out this expectation. Professor Irwin B. Wilson, on purely theoretical considerations of the forces of the protein surface, designed a compound which he postulated would reverse the inhibition of cholinesterase by alkyl-phosphate. This latter action is responsible for the lethal effects of the alkyl-phosphates, which are among the most dangerous poison gases known. Dr. Estelle Meislich synthesized this compound, N-methylnicotin hydroxamic acid. Using this compound, it became for the first time possible to reverse the action of diisopropylfluorophosphate on cholinesterase, which hitherto was generally believed to be completely irreversible.

Another important example of the usefulness of the studies of molecular forces is illustrated by the work of Professor Nachmansohn and his associates on the fish. In the study of the electric characteristics of the membrane of electric cells, in which microelectrodes were inserted and the transmembrane potential measured, significant differences in the reaction to tertiary and quaternary nitrogen compounds were found. The quaternary compounds have a much greater ability to remove the barrier to ion flow across the membrane. These findings have an important bearing on the concept of nerve conduction as well as for the understanding of the mode of action of local anesthetics, curare-like compounds, and other drugs. Studies on the acetylation mechanism and its relation to other metabolic reactions, which are also important for the understanding of the acetylcholine system, have been carried out by Dr. Max Eisenberg.

A symposium on the role of proteins in transport of ions across membranes, supported by the National Science Foundation, was organized by a committee composed of Professor Hans T. Clarke of the Department of Biochemistry as chairman, Professor Robert F. Loeb of the Department of Medicine, Professors Merritt and Nachmansohn of the Department of Neurology, and Professor David Rittenberg of the Department of Biochemistry. Many outstanding physicochemists and biologists from this country and from Europe attended this conference. Among the guests from this country were Professors Peter W. Debye, John T. Edsall, Henry Eyring, John G. Kirkwood, and George Scatchard. The guests from Europe included Professors G. Ehrensvärd from Stockholm, I. J. W. Roughton from Cambridge, Hans H. Ussing from Copenhagen, and Hans H. Weber from Tuebingen, Germany. The lectures of the symposium will be published by the Academic Press in a special volume.

Professor Nachmansohn gave a lecture at the Harvey Society and the Gordon Lecture at the State University of New York College of Medicine.

He also gave lectures at the universities of Chicago and Wisconsin and at the Naval Medical Center at Bethesda.

Dr. Christian Hovde of the Department of Anatomy, in conjunction with Professor Mettler, Dr. James Reilly, Mr. Harlan Stearns and Mr. Alphonse Dupree of the Rockland Research Facility, and with Dr. James B. Campbell of the Department of Neurological Surgery, continued studies upon the effect of lesions in the corpus striatum on the blood sodium and potassium. Dr. Hovde has also been engaged with Professor Agate of the Department of Anatomy in the study of the effect of such lesions on the adrenal gland. With Dr. Pinckney J. Harman and Miss Maleva G. Tankard of New York University, he demonstrated that the caudate nucleus projects to a restricted portion of the cerebral cortex.

Dr. Franco DiBiagio has been engaged in the study of the problem of action potentials in unanesthetized animals. This work, done in conjunction with Dr. Henry R. Liss, Professor Grundfest, and Mr. Walter V. Morgan, is an attempt to learn something about the nature of the pattern of conduction in the spinal cord under conditions of normal activity. Such an investigation is a necessary precursor to the study of abnormal potentials which may occur in connection with abnormal movement. The technical difficulties with the problem are great and require that electrodes, which are implanted during a regular, aseptic operation, under anesthesia, will subsequently be accessible for recording.

Dr. Stanley M. Crain's activities in studying tissue cultures of chick dorsal-root ganglion cells were carried out in conjunction with Professor Mettler and Professor Margaret R. Murray and Mrs. Edith R. Peterson of the Department of Surgery. It was found possible to obtain action, as well as resting potentials, from intracellularly placed microelectrodes. This work has disclosed much fundamental information with regard to the activity of individual nerve units. It promises to serve as a technique of fundamental significance in neurophysiology as well as pharmacology.

Dr. Henry Liss, in conjunction with Dr. James Reilly and Professor Charles R. Noback of the Department of Anatomy, Dr. Arline Deitsch of the Department of Surgery, Dr. Pinckney Harman and Mr. Gerard Lehrer of New York University, and Dr. Gino DiVirgilio of the University of Ottawa, has been engaged in an active study of the degenerative changes which occur after dorsal-root section and dorsal-column section. This study especially concerns the comparison between those changes which occur proximal and distal to the place of section. Dr. Liss has also been engaged with Dr. Irving Cooper of New York University, Dr. George H. Stevens of the Bronx Veterans Administration, and Professor J. Lawrence Pool of the Department of Neurological Surgery, in the study of effects of ligation of the vascular channels which make up the circle of Willis. Dr. Liss, with Professor DeGraff Woodman of the Department of Otolaryngology, is conducting ex-

periments to determine the path of the internal branch of the superior laryngeal nerve.

Mr. Waller V. Morgan has developed a methodology for the permanent implantation of electrodes and is currently engaged in an effort to devise a method by means of which nerve potentials can be delivered to tape recordings for the purpose of analysis of complex envelopes. He has also developed an improvement for cathode-ray tube design.

Dr. Fernando Orioli is studying the effect of the descending limb of the brachium conjunctivum in the spinal cord. This tract has now been found as far down as the sacral spinal cord and determinations are being carried forward to determine the site of its termination.

At the Rockland Research Facility, Dr. Yasuhiko Taketoma and Dr. Per B. Vestergaard have been engaged in a study of protein and steroid chemistry in neuropsychiatric disorders. Dr. Nathan S. Kline has completed a study on the effects of rauwolfia serpentina in neurotic states involving anxiety. The drug produces a slight temporary alleviation of catatonia. Dr. Kline has continued his long-term project on the characterization of schizophrenia. Mr. Harry Feintuch is engaged in the study of vestibular response in psychotic patients with a view to determining whether the mentally ill have an abnormal response to vestibular stimulation. Dr. Edward Cranswick is engaged in the study of thyroid trophic responsiveness in schizophrenia.

DEPARTMENT OF NURSING

Professor Eleanor Lee, Acting Executive Officer

With the exception of the three war years 1943–1945 this year's enrollment is the largest in the history of the School of Nursing. In 1953, 80 percent of the 337 students enrolled are candidates for both the Bachelor of Science degree in Columbia University and the diploma in nursing from the Presbyterian Hospital. The forecast for the class entering in September, 1954, indicates that only students with two to four years of college study will be admitted to the Department of Nursing.

A total of 1,928 students have been enrolled in Columbia University in the Department of Nursing since September, 1937. The withdrawal rate for degree candidates is 15 percent, and for diploma candidates, 22 percent. It is noted also that there are fewer withdrawals in the twenty-eight-month program group than in the three-year program.

The total number of students receiving scholarship aid for the academic year 1953–1954 was thirty-five. The Dean Sage Memorial Scholarship, providing full tuition and University fees for a degree candidate, was awarded to Miss Janet E. Mowry, Class of 1956. Another full-tuition scholarship from the Vivian Beaumont Allen Foundation was awarded to Miss Margaret E.

Frost, a degree candidate in the Class of 1956. The Florists' Telegraph Delivery Association Scholarship was awarded to Miss Marjorie Thorne, Class of 1956. The Mary Sencidiver Specht Scholarship was given to Miss Barbara J. Holt, Class of 1956. The Margaret E. Conrad Scholarship was given to Miss Marguerite A. Walters, Class of 1956. The Jane Craig McAllister Scholarship Fund, established in February, 1952, to help pay the tuition fees of second-year students, gave financial assistance to three students: Miss Sylvia Marcucci of the Class of 1954, Miss Nancy Hanks and Miss Olive Sibold, both of the Class of 1955. Donations to this fund during the year totaled $1,074.75, of which $353.75 was contributed in May by the Class of 1955.

We are indebted to the Columbia University Committee for Community Service for scholarships from the proceeds of the Thrift Shop. A total of eighteen partial scholarships from the Alumnae Association of the Presbyterian Hospital School of Nursing were awarded in April, 1954, to four students in both the Class of 1954 and the Class of 1955, and to eleven students in the Class of 1956. A total of $400 was granted for University stipends. Four New York State scholarships were approved.

Two additional scholarships of $100 each were given in May by the Women's Auxiliary of the Florists' Telegraph Association. Two scholarships from the Visiting Nurse Service of New York were awarded in October, 1953, to Miss Barbara A. Field and Mrs. Barbara Knight Robinson, Class of 1953.

Miss Angela J. Del Vecchio was appointed instructor in nursing to replace Miss Dorothy E. Reilly, who was assigned to a research project in the department. Miss Lucille M. Dewey was appointed instructor in nursing to replace Mrs. Annie Bullick Orr.

Miss Beatrice M. Dorbacker was appointed instructor in nursing to assist with the teaching of the introduction to nursing and medical and surgical nursing courses to the increased number of first-year students. Miss Alice K. Faulkner was appointed instructor in nursing, assigned to nutrition and diet therapy, replacing Mrs. Shirley Tanner Myers, who resigned.

Miss Marjorie H. Stewart resigned in November and was replaced by Miss Jane Bishop, instructor in nursing assigned to night duty on the medical and surgical services. Miss Elizabeth L. Watling was appointed instructor in nursing assigned to outpatient nursing service, to replace Miss Elizabeth M. Kennedy, who resigned.

The nursing program of the twenty-fifth anniversary celebration was the outstanding event of the year. The main speaker was Miss Margaret G. Arnstein, chief of the Division of Nursing Resources, United States Department of Health, Education and Welfare on the topic, "Nursing Changes and Yet Stays the Same."

In January a two-day workshop was held for the faculty discussion of the student assignments to the various clinical areas. The revised rotation plan indicates considerable progress. The new assignment plan for the Class of

1956 places the twelve-week program in obstetric nursing, instruction, and practice four months earlier than for previous classes. It also provides medical and surgical nursing experience in blocks of three months, one block in the second year with a sounder program of clinical teaching and another block in the senior year with instruction and experience in team leadership on the general medical and surgical services. The junior classes will continue in a block of ninety semester hours to be given during the medical and surgical experience in the second year. These classes will be given to four groups: one group in January–February and one in April–May in addition to the two groups from September to December as previously scheduled. This plan provides a continuous flow of students to the services concerned: general medical and surgical (including recovery room), operating room, obstetrics, and pediatrics.

In June the group of four-year college students in the Class of 1956 started a combined program of obstetric and pediatric nursing of twenty-four weeks. This experimental plan will provide experience in the care of premature infants during the first twelve weeks of obstetric nursing, with opportunities for teaching mothers as well; the program will emphasize throughout the community aspects of nursing. To enrich the content of the program for this group it is planned to include also some experience on the orthopedic service.

The clinical teaching committee completed an important project this year in the curriculum survey for public health content. The material was classified under these main headings: social and health aspects; community (including field trips); and public health science and public health nursing.

The faculty's interest in patterns of field experience in public health nursing offered to students in basic collegiate schools of nursing formed the basis for Professor Pettit's study while on sabbatical leave this spring. The faculties of seven schools of nursing and the staff of a field agency offering a particularly unique field experience were generous in giving their time and sharing their thinking in relation to the common problem. It would appear that considerable study and experimentation are necessary in this area, particularly in the light of current developments in public health.

The Outpatient Nursing Service has had a record year with the largest patient load and number of visits since it was started in 1946. A total of 3,712 visits were made by ninety-nine student nurses and the number of new patient referrals was 627. The increasing number of recent graduates entering the public health field is attributed directly to the excellent preparation received during this two-week experience of visiting patients in their homes.

During the year ninety-six graduates of the Department of Nursing took the New York State Board Examinations. The mean for the ninety-six candidates is as follows: psychiatric nursing 92.7, pediatric nursing 91.6, medical nursing 91.5, obstetric nursing 90.9, and surgical nursing 90. In addition four graduates completed successfully their state board examinations in the states of Minnesota (2), Connecticut (1) and Ohio (1).

The first year of research under the grant from the China Medical Board, Inc., has been one of exploration under the enthusiastic leadership of Miss Dorothy E. Reilly.

In studying the medical and surgical clinical fields and their adjuncts, the admitting clinic and recovery room, six areas were selected as test situations to determine the learning experiences available. The department is especially appreciative of the cooperation and support from other members of the Medical School faculty. One of the most interesting studies has been the pilot study on the men's medical service to determine the value of joint clinical conferences with student groups concerned with patient care. Professor Franklin M. Hanger, Jr., of the Department of Medicine has been particularly instrumental in making this experiment a success.

Four weeks of senior experience for ten students from the Yale School of Nursing was arranged between January and May.

Field-work experience for twenty-six graduate nurse students from the Division of Nursing Education at Teachers College was arranged.

Since January, 1954, two graduate nurses on the staff of Maternity Center Association have spent two days per week in the obstetric antepartal clinic and have assisted Miss Margaret A. Hogan, instructor in nursing, in teaching "prepared childbirth classes."

The second Anna C. Maxwell Fellowship was awarded in January, 1954, to Miss Yvonne Hentsch, director of the Nursing Bureau of the League of Red Cross Societies in Geneva, Switzerland. Miss Hentsch is a guest in Maxwell Hall during her year of study in the Division of Nursing Education at Teachers College.

A conference, "A Century of Progress in Nursing," was sponsored jointly by the Department of Nursing and the Division of Nursing Education at Teachers College to mark the mutual observance of the two-hundredth anniversary of the founding of Columbia University and the one-hundredth anniversary of Florence Nightingale's work in the Crimea.

At the November meeting of the Boards of Review of the Accrediting Service of the National League for Nursing the programs offered by the Department of Nursing were approved for full accreditation. The survey of the Department of Nursing program was made in September, 1950. According to the new policies for accreditation each fully accredited program will be surveyed every six years. The former annual report will be replaced by a written report three years after each survey.

Agency membership in the National League for Nursing in the Department of Baccalaureate and Higher Degree Programs was received for the year 1954 after payment of dues of $200 in January.

During the academic year 2,370 inquiries for the school bulletin were received and 271 applications were completed. The number of candidates accepted for September, 1954, is 120.

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Professor Howard C. Taylor, Jr., Executive Officer

The year has been marked by numerous changes in the membership of the department. Two of these have resulted from the deaths of men long prominent in the department. Dr. Eugene S. Coler died while on active service as colonel in the Air Force in England. He was on leave of absence as associate clinical professor of obstetrics and gynecology, having been a member of the Medical School staff since 1927. During the years since his first appointment, Professor Coler had developed a firm reputation for his clinical competency. Dr. Joseph W. Draper, assistant clinical professor, died on January 31, 1954. He had been a member of the teaching staff since 1925. Professor Draper contributed many years of service to the teaching program as chief of the obstetrics and gynecology clinic in the Vanderbilt Clinic.

On April 1, 1954, Professor Charles L. Buxton resigned to become professor of obstetrics and gynecology in the Yale University School of Medicine. For many years a leader in the field of gynecologic endocrinology and the problem of fertility, and director of the Sterility Clinic in this department, his loss will be keenly felt. Professor Buxton is taking with him to New Haven two members of the resident staff, Dr. William C. Billings and Dr. Bruce S. Waldie, and a visiting fellow in this department from Belgium, Dr. Raymond Vande Wiele.

Dr. Susan Williamson has been made director of the Obstetrical Division of the New York Infirmary. This may somewhat reduce her time available for the teaching program, although her connections will continue. Dr. Byron C. Butler has resigned to enter the private practice of gynecology in Phoenix, Arizona. As partial replacements, new appointments have been accepted by Dr. Anna L. Southam and Dr. Harold M. M. Tovell. On July 1, Dr. Anna Southam, who has been a United States Public Health fellow, will assume a regular position as instructor on the modified full-time staff and will succeed Professor Buxton as head of the Sterility Clinic. On the same date, the present resident, Dr. Tovell, will become an instructor in the department on a part-time basis.

Among promotions may be mentioned those of Dr. Stanley M. Bysshe, Dr. Saul B. Gusberg, and Dr. Charles M. Steer, each from the rank of assistant professor of clinical obstetrics and gynecology to associate professor of clinical obstetrics and gynecology. Dr. Equinn Munnell has been promoted from the rank of associate to that of assistant clinical professor of obstetrics and gynecology; Dr. Susan Williamson to associate from instructor; Dr. Dean J. Grandin and Dr. Arnold N. Fenton to instructor from assistant. The following members of the research staff have been promoted from the rank of research assistant to research associate: Dr. Margaret E. Long, Dr. Dudipala V. N. Reddy, Dr. Helena de Roetth, and Dr. Louise L. Phillips.

The appointment of Dr. Alan Guttmacher as director of the Obstetrical and Gynecological Service of Mt. Sinai and as clinical professor of obstetrics and gynecology in this department has lead to a plan for the use of this affiliated service as a part of the teaching program. On two afternoons a week, selected students go to Mt. Sinai for special teaching rounds and each night two students sleep in that hospital and remain on call for additional instruction in problems of delivery. It appears that this plan will significantly increase the students' clinical experience in obstetrics and broaden their educational opportunities.

The clinical work of the department in the Presbyterian Hospital has remained at about the same volume. The year 1953 was again a fortunate one in that there were no maternal deaths among the 3,768 women delivered. The work was also noteworthy in that the fetal mortality on the ward service of the Obstetrical Division was 17.4 per thousand, the lowest that has been reported in the department. Reference may also be made to the recent increase in the clinical load being carried at the Francis Delafield Hospital and in particular to the rise in the admission of cancer patients to the Gynecologic Service in a stage in which treatment might be given with some hope of cure. The Francis Delafield Hospital seems about to fulfill its promise of being an important asset to the teaching and research program of the Gynecological Department and of other departments as well.

Studies on the biochemistry and physiologic mechanism of the steroids, products of adrenal, gonadal, and placental metabolism, have been continued by Professor Seymour Lieberman and his group. Particular emphasis has been placed on the synthesis and properties of steroid imidazols—with Dr. Ulrich Weiss; the synthesis and hydrolysis of steroid glucuronides—with Mr. Paul Levitan; and the general application of infrared spectral analysis to problems of steroid biochemistry—with Dr. Weiss, Miss Mathilda Furman, and Mr. Joseph Zamora.

Professor Joseph W. Jailer, collaborating with Dr. Jay J. Gold, a fellow of the American Cancer Society, Dr. Eleanor Wallace, a Damon Runyon Foundation Fellow, and Dr. Raymond Vande Wiele, a Belgian-American Foundation Fellow in obstetrics and gynecology, has continued his investigations on the steroid effects in congenital adrenal hyperplasia. It has been found that there is a group of hirsute women who excrete large amounts of dehydroisoandrosterone. On cortisone therapy dehydroisoandrosterone disappears from the urine. There is another group of hirsute women whose urinary excretion pattern is normal and whose other symptoms (for example, amenorrhea) are improved by removal of portions of the ovaries. It appears therefore that there are two groups presenting these general clinical symptoms: one in which the syndrome is adrenal in origin and in the other ovarian. This group plans to study the urinary excretion of "electrocortin" and the separation of the components of the human urinary gonadotrophin complex.

In the related field of fertility in women, Dr. Southam, with Professor Earl T. Engle, has been pursuing her studies on the problem of induction of ovulation in anovulatory women. Dr. Southam is also continuing the work, begun under Professor Buxton, on the bacteriology of the cervical mucus in relation to problems of sterility in the female.

Dr. Landrum B. Shettles has continued his studies on the human ovum with special reference to maturation stages, fertilization in vitro, and early cleavage stages in order to gain a more thorough understanding of the early development of the female germ cell. He is continuing his studies on the enzymatic content and activity of the follicular fluid, the fallopian tubal mucosa, cervical mucus, and semen.

The approach to the important problem of the cause of congenital anomalies is difficult to undertake with the human being as a subject, and in consequence the work on the causation of such changes in animals becomes essential. During the last year, Dr. Salome Gluecksohn-Waelsch has been successful in inducing brain abnormalities in mouse embryos by immunological techniques. These abnormalities resemble closely those known to appear spontaneously in mice colonies, apparently on a hereditary basis. Thus, an approach appears to be open for the study of the mechanisms by which certain hereditary changes or mutations produce their deleterious effects on embryonic growth and differentiation. The study of a new mutation which arose in our mouse colony and is responsible for hereditary chondrodystrophy, a condition also known in man, has been continued. During the year Dr. Gluecksohn-Waelsch has been assisted by Dr. Karl Theiler from the Medical School of the University of Zurich.

Professor Charles M. Steer is continuing work begun under Professor Buxton on fetal wastage in relation to possible A-B-O blood-group incompatibility. Major group incompatible matings are being studied with relation to early abortion, stillbirths, certain blood dyscrasias, and to cerebral palsy. The work is being supported by the United Cerebral Palsy Foundation and is being done in cooperation with Dr. Milton Singer of the Department of Pediatrics, Dr. Philip Levine at the Ortho Foundation, and Dr. Howard Levene from the Institute of Human Variation at Columbia University.

The investigation of the physiology and metabolism of women during pregnancy has been continued in a number of directions.

Professor Lieberman and his group have been studying the steroid mechanisms in pregnancy and in particular the metabolism of these substances by the placenta. The investigation of the synthesis of steroid hormones by means of the perfusion of isolated placentas with C-14 labeled steroids is well under way. The nature of the 17-ketosteroids excreted by pregnant patients and the excretion of corticoids in normal pregnancy are under investigation.

Studies concerned with electrolyte and water metabolism have been carried forward under the special direction of Professor Albert A. Plentl, in association with Drs. Mary Jane Gray, Earl D. Neslen, and Salim J. Dalali. The

problems related to fluid electrolyte exchange between mother, fetus, and amniotic fluid are still under investigation. These studies are expected to yield valuable information on the placental exchange, the nutrition of the fetus, the passage of drugs, and the etiology of a number of pathologic conditions of the conceptus.

Work instituted by Dr. Butler on the fibrinolytic systems in the blood during pregnancy is being continued by Dr. Phillips. Particular reference is being made to the problem of hemorrhage due apparently to afibrinogenemia in cases of premature separation of the placenta, but the study of fibrinogen, fibrinolysis, and the activators and inhibitors of this process are being extended to the investigation of a number of complications of pregnancy including toxemia and intra-uterine fetal death of unknown origin.

Studies on intra-uterine pressures during labor have been continued by Drs. Robert L. Hallet and Stephen G. Burgess. Dr. Emanuel A. Friedman has been developing a method for the graphic analysis of labor based particularly on the rate of cervical dilatation. In conjunction with Dr. James A. L. Mathers of the Department of Medicine, Dr. Friedman has commenced a study of certain hemodynamic changes in labor by means of ballistocardiographic recordings. Professor D. Anthony D'Esopo and Dr. David B. Moore have completed a clinical study on the use of pituitrin in uterine inertia.

An analysis of the time and frequency of fetal death in over four thousand cases of toxemia of pregnancy has been completed by Professors Taylor and Alvin J. B. Tillman and Dr. Joseph Blanchard with the view to establishing a formula for clinical use in predicting the probability of fetal loss and giving indications for the time of induction of labor and in the interests of the fetus. Professor Tillman is continuing the clinical analysis of problems of cardiac disease in pregnancy and the relation of hypertension to toxemias of pregnancy.

The psychological aspects of obstetrics and gynecology continue to be investigated by Dr. Lothar Gidro-Frank. Particular attention is given to the study of patients whose pelvic pain is without apparent organic origin. The services of a clinical psychologist have been obtained. Dr. Gidro-Frank is also developing a weekly seminar for the group of students assigned to obstetrics and gynecology on the psychodynamics of certain obstetrical and gynecological conditions.

Research in the causes and therapy of gynecologic cancer has been particularly active because of the extreme importance of neoplastic disease in all gynecologic work. This work may be considered under four major divisions, namely, steroid chemistry and physiology, the study of tissue differentiation in gynecologic tumors, pathologic studies, and clinical investigations.

The studies on the steroid hormones include the work already mentioned: in the laboratories of Professor Lieberman and the studies of Professor Jailer and his group on adrenal hyperplasia and related problems. The steroid

techniques developed by Professor Lieberman are being applied to the study of the nature and amounts of 17-ketosteroids excreted by patients gonadodectomized and adrenalectomized in a course of treatment for malignant tumors. The effect of radiotherapy on excretion of 17-ketosteroids, an important measure of adrenal function, is being observed in a number of cases treated at the Delafield Hospital in cooperation with Dr. Morrie M. Gelfand.

A broad, integrated program has been set up in an effort to correlate the "degree of malignancy" or "tissue differentiation" with various histochemical and biochemical aspects of ovarian and uterine tumor. Using histochemical techniques, Dr. Margaret E. Long has demonstrated an apparent increase in the average number and average size of the nucleoli with an increase in degree of malignancy of the tumor tissue, indicating, at least so far as the nucleolus is concerned, an apparent increase in the amount of ribonucleic acid. Among the biochemical studies, Dr. Dudipala V. N. Reddy has been studying the total ribonucleic acid and desoxyribonucleic acid in relation to tumors of various degrees of malignancy. He has also been studying certain enzyme systems and suggests that D-amino acid oxidase and arginase activities are present only in benign tumors or those of low-grade malignancy. Succinoxidase activity appears to be totally absent in human ovarian tumors. The rate of oxygen uptake of tumor slices of various degrees of malignancy has been studied by Dr. Helena de Roetth, who believes that oxygen consumption and lactic acid production increase with the degree of malignancy of tumors, particularly those primary in the ovary. The entire program is being strengthened by the cooperation with a project under the direction of Dr. Michael J. Kopac, professor of biology at New York University, who is studying the same material by tissue culture.

Professor Gusberg, in association with Dr. Long, has been seeking methods of determining the radiosensitivity of cervical cancer by means of a series of biopsies taken during radiation therapy. These biopsies are being examined for ribonucleic and desoxyribonucleic acid. Such a test, if practical, would obviously be of enormous value in determining therapy in cancer of the cervix. The precancerous lesions of the cervix endometrium remain under the investigation of Professor Gusberg, with the assistance of Dr. David B. Moore and Dr. Tovell.

The morphology of the ovary in gynecologic cancer is being investigated by Mr. George Rudinsky and Mrs. Dorothy Shook, under the direction of Professor Taylor, by means of complete serial sections. It is hoped by this means to be able to quantitate the total functioning tissue of the ovaries.

Using a modification of the dye dilution method for serial estimations of plasma volume, Dr. Gelfand has begun a study of the effect on blood volume in massive X-ray therapy direct to the pelvis. Dr. Dalali has been working on X-ray venography of the pelvis in cases of cancer of the cervix and has made extensive anatomical studies of the venous system in the pelvis. Profes-

sor James A. Corscaden and Dr. Tovell have completed a clinical analysis on the management and end results of 247 cases of endometrial cancer treated at the Presbyterian Hospital from 1937 to 1948.

Members of the department have given approximately sixty lectures or discussions at meetings outside Columbia University. A number of visits and lectures outside the United States have also been given. Professor Jailer lectured at the universities of Louvain, Paris, and Basle. Professor Gusberg lectured at the Curie Institute in Paris.

Professor Earl T. Engle is currently serving as president of the Endocrine Society. Professor Taylor is president-elect of the American Cancer Society, Inc.

In summary, it may be said that the research program of the department expanded during the last year. The major problem is that of recruiting scientifically interested clinical and preclinical personnel.

DEPARTMENT OF OPHTHALMOLOGY

Professor JOHN H. DUNNINGTON, Executive Officer

During the year 1953–1954 the Department of Ophthalmology sustained a great loss in the death of Professor LeGrand H. Hardy. He will be sorely missed, for his intense interest in the residency training program and in the teaching of the basic sciences made him a most valuable member of the department. Because of his vast knowledge of mathematics, combined with his enthusiasm and unbounded energy, he was an ideal director of the Knapp Memorial Laboratory of Physiological Optics. His researches on color perception and binocular visual space won for him an international reputation. There have been no resignations and the appointment of Dr. Andrew de Roetth, Jr., as assistant is the only addition. Both the undergraduate and the residency teaching programs have remained unchanged.

The department has been fortunate in having instructive lectures given by distinguished visitors: "Studies on Diabetic Retinopathy" by Dr. Norman Ashton of the Institute of Ophthalmology, London; "Physiology of the Cornea in Relation to Swelling and Vascularization" by Dr. Maurice E. Langham of the Institute of Ophthalmology, London; "Facial Asymmetry" by Mr. Frank Law of Guy's Hospital, London; and "Keratometry and Its Applications" by Mr. A. Seymour Philps, Moorfields Hospital, London.

The research conducted under contract with the Office of Naval Research by Professor Hardy, Dr. Gertrude Rand, and Miss M. Catherine Rittler in the Knapp Laboratory of Physiological Optics has been completed. Their findings have supported Luneberg's theory that the binocular visual space is a determinate metric of constant negative curvature. They have compared the Hardy, Rand, Rittler color vision test with other tests in current usage in the Armed Forces and pointed out the advantages of this qualitative method. Dr.

Rand presented these findings at a meeting of the Armed Forces National Research Council Vision Committee in San Diego. Miss Rittler received a citation of merit from her alma mater, Goucher College, for her contribution to our knowledge of color vision.

Professor Ludwig von Sallmann under the auspices of the Knapp Memorial Foundation and assisted by several grants-in-aid has conducted several investigations. The first is a continuation of studies on radiation cataract. This work has been done under the guidance of Professor G. Failla of the Department of Radiology and in collaboration with Dr. C. A. Tobias of the University of California. Additional cytological studies have been made of the effect on the lens epithelium of radiations of different linear energy transfer in an attempt to determine the ratio of alpha particles and deuterons to X ray. The ratio was statistically significant when the number of injured cells was taken as the criterion; when the depression of mitosis was used as an indicator of radiation damage, the results were less significant. To provide a better understanding of the pathogenesis of galactose cataract, extensive morphological studies were made of the lens epithelium and the lens fibers in the early stages of the lesion. The dramatic increase observed in mitotic activity seems to be a protective function and precedes visible changes in the lens fibers. Changes in the lens epithelium resulting from old age were studied in a great number of rats, and the type of cellular degeneration was found to be similar to that caused by ionizing radiation. The results of these investigations were reported at the Fifth Conference on Radiation Cataract under the auspices of the National Research Council. Further study of the early cytological changes induced by radiation revealed that they occur about twenty minutes after exposure to the X-ray beam.

With coworkers Dr. Burkhard Pillat and Miss Margaret Powers, Professor von Sallmann has investigated effects of adrenergic and ganglionic blocking agents on intraocular and blood pressure. Among the agents used were noradrenaline, acetylcholine (i.v.), and electrical stimulation of the superior cervical sympathietics. The experiments indicate that the fall in eye pressure induced by these agents is relative to the fall in blood pressure. No dissociation between the two pressures was observed with the compounds tested in this series. The magnitude of the fall is dependent upon the existing mean pressure level. In general, the effect of these compounds is of short duration.

Professor von Sallmann has been studying also the influence of ACTH on the reactivity of the terminal vascular bed. In a previous series of experiments these same workers had observed that intravenous ACTH often potentiated the reactivity of the peripheral vascular apparatus of cats to adrenaline, noradrenaline, acetylcholine, and electric stimulation of the cervical sympathetic nerve, whereas cortisone infusions did not effect a measurable change in these responses. Since these results created a suspicion that pressor substance impurities in the ACTH preparation were responsible for the increase in responses, studies were conducted using substances with known low content

of contaminating pressor substances. It was found that an ACTH preparation with a very low content of pituitary posterior lobe pressor substance elicited changes in the intraocular pressure and blood pressure similar to those observed with an ACTH preparation of unknown contamination with these pressor substances.

In collaboration with Dr. Otto Lowenstein, Miss Irene Lowenfeld, Miss Margaret Powers, and Miss Paula Pfaff, Professor von Sallmann conducted experiments on responses of the intraocular and blood pressure to electric stimulation of the diencephalon. A technique was perfected for the study under controlled conditions of the influence of the diencephalon on various functions of the autonomic system. Although the experiments to date are too few to permit definite conclusions, the preliminary findings indicate that stimulation of certain areas of the hypothalmus effect changes in the intraocular pressure either independent of, or in opposition to, changes in the blood pressure. It is hoped that this investigation will contribute to a better understanding of one of the basic problems of regulation of the intraocular pressure.

Studies on absorption of blood from the vitreous have been made by Professor von Sallmann in collaboration with Professor Zacharias Dische, Dr. John M. Walcott, and Dr. Anthony Donn, under a contract with the Office of the Surgeon General of the United States Army. This problem was approached by studying the effect of various enzymes on the absorption of experimentally induced vitreous hemorrhages. After using many purified enzymes it can be said that this form of treatment for traumatic hemorrhages does not seem promising, nor does the use of ultrasonic waves appear to be of therapeutic value.

Professor George K. Smelser and Miss Victoria Ozanics have continued their investigations on exophthalmos. They have evidence that experimental exophthalmos results from the action of at least two anterior pituitary hormones. Their studies have revealed that ACTH produces adrenal cortical steroids by stimulating the adrenal gland. These steroids act synergistically with the pituitary hormones to cause exophthalmos. Furthermore, they have shown that some of the anterior pituitary hormones are neither directly involved in causing exophthalmos, nor do they act synergistically with cortisone to affect the orbital tissues. They believe that the growth hormone, the gonadotrophin complex, and prolactin play no role in the production of exophthalmos and, therefore, by the process of elimination they contend that the thyrotrophic hormone, acting in conjunction with adrenal steroids, is the endocrine basis of the orbital changes.

Working under a grant from the United States Army, Professor Smelser, with the assistance of Mr. Richard Copenhaver, studied the feasibility of using frozen corneas as donors in corneal transplants. They found that such frozen tissues healed with great difficulty and the grafts almost invariably became opaque.

In the pupillography laboratory Dr. Lowenstein, with the assistance of Miss Lowenfeld, has perfected an electronic direct-writing pupillograph which should make the recording of pupillary responses a generally applicable method for both clinical and experimental use. His investigations of the mechanism responsible for the miosis found with the Argyll Robertson pupil have shown it to be due to abnormal cholinergic activity and not to a lesion in the sympathetic system.

Having established that in humans precipitation of the thiolic groups of soluble lens proteins occurs in the process of aging as well as in the formation of cataract, Professor Dische, in collaboration with Miss Ellen Borenfreund, studied the availability of these proteins for oxidation. They found their availability was increased in the early stages of experimentally produced galactose cataract but no increase in oxidation occurred in either the aged or in those with senile cataracts. This result suggested that in these two conditions oxidation of the lens proteins proceeds in such a way that only one small fraction undergoes greater oxidation; the main bulk of the proteins remains unaffected. Fractionation of the lens proteins proved the correctness of this observation. Professor Dische continued his experimental studies on the metabolism of the lens capsule, and found that under certain conditions it is able to break down anaerobically glucose as well as its phosphorus esters. Even when the epithelium is removed from the capsule the remaining fibrous membrane still is able in the presence of adenosinetriphosphate (ATP) to glycolyze glucose.

Professor Seymour P. Halbert by his investigations on the antibiotic-producing activities of the ocular bacterial flora has shown that in the presence of highly active antibiotic-producing micrococci, a marked degree of protection exists against many lethal doses of clostridia. Non-antibiotic producers were completely without this protective effect, which highly active organisms exerted against infection with either *Clostridium septicum* vegetative cells or spores. The degree of protection paralleled the dosage of antibiotic-producing micrococci. When the micrococcal suspensions were heat-killed prior to production of the mixed infection, the protection was drastically decreased, but not completely eliminated.

Many ocular micrococci of varying antibiotic-producing activities have been tested for their susceptibility to the more common antibiotics. All proved to be of the same degree of susceptibility to these agents. In addition, resistant variants have been developed to several micrococcal antibiotics, and it has been found that these retain susceptibility to a number of commercial antibiotics. These findings show that the micrococcal antibiotics act by mechanisms distinct from those of the common clinically useful drugs. A study with Dr. Devorah Locatcher Khorazo on seasonal variations in concentration of antibiotic-producing organisms in the ocular flora has been carried to completion and a statistical analysis of the data is currently being made.

The studies of Professor John H. Dunnington and Dr. Ellen F. Regan on

the use of absorbable sutures in cataract surgery were published in *The Archives of Ophthalmology,* November, 1953. Professor Algernon B. Reese and Dr. George A. Hyman of the Department of Medicine, have initiated a study of the use of triethylene melamine (TEM) in the treatment of retinoblastoma. In association with Dr. Josef Stepanik, Professor Reese has reported on the role of oxygen in the production of retrolental fibroplasia. Other clinical problems that have been studied during the past year are: the effect of retrobulbar injection of novocain on the optic nerve, by Dr. Frank D. Carroll; the removal rate of radiosodium (Na. 24) from the human orbit in Graves' disease, by Dr. Robert Day; the relation of tonography to the phasic variations of intra-ocular pressure, by Dr. de Roetth. Investigations on other aspects of glaucoma are being conducted by Professor Willis S. Knighton and Dr. de Roetth, and on detachment of the retina by Dr. Graham Clark. Most of these research activities have been financed by grants-in-aid from several foundations, some of which are: the Mary W. Harriman Glaucoma Fund, the Dunlevy Milbank Fund, the Sloan Foundation, the Snyder Ophthalmic Foundation and the Whitehall Foundation.

DEPARTMENT OF ORTHOPEDIC SURGERY

Professor Alan DeForest Smith, Executive Officer

A diversified number of research projects and clinical investigations have been carried out by members of the Department of Orthopedic Surgery during the year. Professor C. Zent Garber of the Department of Pathology, in connection with his studies of giant cell tumors of the bone, has succeeded in producing synovial and bone lesions in experimental animals with a synthetized compound related to material found in these tumors. The material received in his laboratory has included a number of metastatic tumors in bone, comprising an interesting group for study. He also has had an opportunity to observe the postoperative reactions in bone following the insertion of prostheses for replacement of the head of the femur, and from these, to reach some conclusions about their efficiency.

Drs. Balu Sankaran and Robert Samilson have studied a group of forty-six cases of Charcot joints, of which nineteen were treated by arthrodesis, the largest series of cases subjected to this operation so far reported. This study indicates the success of this treatment when it is carried out early in the disease. Professor Frank E. Stinchfield and Drs. Sankaran and Samilson have demonstrated by experiments on animals that apparently heparin has an inhibitory effect upon the repair of bone. This may be of some clinical significance because of the frequency with which heparin is used as an anticoagulant following operations.

Professor Harrison L. McLaughlin, with Dr. Alexander Garcia, has evaluated the results of treatment of intertrochanteric fractures of the femur

by a combination of triflange nail and adjustable plate which Professor McLaughlin devised. Professor McLaughlin has also analyzed the results of treatment of fractures of the carpal navicular bone by a lag screw which he made for this purpose.

Professor Frederick M. Smith has completed a book on the surgery of the elbow. Dr. Charles S. Neer II is studying the effects of fractures on the growth of the femur in children. Dr. Garcia is making a study of fractures of the shaft of the femur treated by internal fixation as a part of a project of the American Academy of Orthopaedic Surgeons. He and Dr. Robert E. Carroll have completed a report of 100 cases of acute calcium deposits in the hand in which they have pointed out the relative frequency of this condition and the severity of the symptoms which it sometimes causes. Dr. Carroll has also presented a report on the occurrence of osteoid osteoma in the hand.

A study has been made and reported by Professor Stinchfield and Dr. William Sinton of 100 cases of transitional lumbosacral vertebra. An interesting feature of this study was the high incidence of sciatic pain; thus we recognize another cause for this syndrome not associated with disc herniations.

At a combined meeting of the Latin American and Brazilian Orthopaedic Associations in Brazil in July, 1953, Professor Alan DeForest Smith read a paper on the modern treatment of bone and joint tuberculosis. Professors Smith, W. Harrison von Lackum, and Robert H. Wylie of the Department of Surgery reported to the American Orthopaedic Association an operation for the stapling of vertebral bodies in the treatment of scoliosis.

A broad program of basic research is in progress on a number of problems which require histochemical or tissue-culture methods for their solution. Dr. Gabriel Godman is studying the pathogenesis of experimental lathyrism in the rat and other species. Lathyrism is an intoxication with a factor present in the sweet pea seed which has been known to occur in man. It is characterized in the experimental animal by the occurrence of destruction of vertebrae, other bony deformities, etc. Dr. Godman was successful in producing a typical kyphoscoliosis in rats, and striking deformities of the notochord in tadpoles.

In continuing his work on the histochemistry of striated muscle in vivo and in vitro, Dr. Godman is collaborating with Dr. Eric Hirschberg of the Department of Biochemistry in studies of the nucleic acids. Several interesting facts have been discovered about the new growth of sarcoblasts after injuries to the muscles.

Some fundamental characteristics of the behavior of the osteoblast in tissue culture are being investigated by Dr. Andrew Bassett in conjunction with Dr. Godman. Dr. Bassett has shown that in a stage of their development in the culture the osteoblasts exhibit well-marked alkaline phosphatase activity in contrast to other mesenchymal cells. In addition to discovering some of the basic facts about the behavior of these cells, the feasibility of growing mass cultures of osteoblastic tissue is being studied.

In the same laboratory the chemistry of the production of mucopolysaccharides by various mesenchymal cells in mass tissue culture is being investigated by Professors Charles A. Ragan, Jr., and Karl Meyer, and Dr. Henry Grossfeld of the Department of Medicine.

Dr. George B. Ambrose was appointed instructor in orthopedic surgery and assistant attending orthopedic surgeon to the New York Orthopaedic Hospital on July 1, 1953. The resignation of Dr. Frank Knocke as instructor in orthopedic surgery was accepted with regret.

DEPARTMENT OF OTOLARYNGOLOGY

Professor Edmund P. Fowler, Jr., Executive Officer

Demand for well-trained ear, nose, and throat specialists persists. Positions available range from university professorships to fellowships in head and neck pathology. Apparently this is because very few medical students or interns know of the extraordinary clinical and research opportunities in the specialty of otolaryngology.

The department regrets to announce the retirement of Professor James Babcock after a quarter-century of devoted service. Other members of the department who have resigned are Professor George Brighton, Dr. Edwin Opin, Dr. Walter Glass, and Dr. William Holden. We are happy to welcome Professor Arnold Kremen, who comes from the University of Minnesota, to act as chief of the head and neck division.

Professors Franz Altmann, Edmund P. Fowler, Jr., and DeGraff Woodman were guests at the Pan-American Congress of Otolaryngology in Mexico City, where they spoke on "Pathology of Vertigenous Syndromes," "Nerve Deafness," and "Laryngeal Paralysis," respectively.

Professor Daniel C. Baker, Jr., has been active on the Residency Review Committee of the Council on Medical Education and Hospitals of the American Board of Otolaryngology. Dr. Herbert Friedman gave two lectures in Zurich, Switzerland, on various phases of plastic surgery of the nose.

Professor Fowler, Dr. Robert M. Hui, and Mr. Donald Markle have been instrumental in developing a plan for the care of the deaf and hard-of-hearing children in the City of New York for the Board of Health. This plan was used as a basis for a state-wide plan now being implemented by the State Board of Health. Dr. Hui, as a consultant in otolaryngology for the Health Department, has been making a survey of the speech and hearing facilities in the New York hospitals. For the past year Professor Woodman has been secretary of the Otolaryngology Section of the New York Academy of Medicine and has been elected chairman for the ensuing year.

As usual, numerous papers were published and lectures given in various parts of the country by many members of the department.

DEPARTMENT OF PATHOLOGY

Professor Harry P. Smith, Executive Officer

It is only natural that the celebration of Columbia University's Bicentennial would direct attention to many of the historical aspects of education. The immediate interest of the department is with methods used in teaching students of medicine. It is well known, of course, that medicine is now taught by a combination of "systematic" instruction and "case study." In systematic instruction, the lectures, demonstrations, and laboratory assignments of one day prepare the way for those to follow. In contrast, the case study method involves individual, first-hand study of patients, either at home, in the office, or in the wards of a hospital. Case study also involves studies conducted in the autopsy room, as well as study of tissues or other specimens collected from the patient during life.

In some countries, case study is now introduced quite early into the medical curriculum, at the expense of systematic instruction. In our own country, in contrast, the first two years of the curriculum are devoted mainly to systematic instruction in the basic sciences of anatomy, biochemistry, physiology, pharmacology, microbiology, and pathology. Brief introductory courses, systematic in nature, are often given in public health and in certain clinical subjects. Departments of pathology usually employ case study as a supplement to systematic instruction, and this is the policy in our own department.

In most schools, including our own, the clinical departments responsible for the last two years of the curriculum now employ the case study method almost exclusively.

Current emphasis on systematic instruction in the first two years of the curriculum, and on case study in the last two, presents a contrast in methodology which has not always existed in the medical schools of this country. A century ago, the formal instruction in the clinical departments was also systematic in character and was carried out by lectures and demonstration of patients brought into the amphitheater to illustrate specific points. In addition, however, the student had abundant opportunity for case study by virtue of his apprenticeship to physicians engaged in private practice. Moreover, the formal systematic instruction in the medical schools had a total duration of merely a few months, whereas the same students served the apprenticeship over a period of several years.

Gradually, in the latter part of the last century, the medical school curriculum was lengthened into the present four-year program. At the same time, the system of apprenticeship withered away and was entirely abolished prior to the beginning of the present century. Throughout this period, the clinical departments responsible for the last half of the curriculum continued to rely heavily on the systematic instruction provided by lectures and amphitheater demonstrations. With disappearance of the apprenticeship, the stu-

dents were left very little practical experience in dealing individually with patients. The deficiency was clearly recognized in the closing decades of the century. To correct for loss of the apprenticeship, steps were taken to utilize hospitals more effectively in the teaching programs. Gradually, over the past sixty years, clinical clerkships have been established in almost every medical school of the country. This is a type of junior internship, analogous to the apprenticeship of former times except that it is carried out entirely within hospital walls. It has proved to be a very effective method of providing case study.

With the introduction of student clerkships, the time available for clinical lectures and demonstrations was reduced. Moreover, the cases assigned to students are necessarily of all types and are of all degrees of complexity, no two students having exactly the same type of case. It thus becomes impossible for systematic lectures to keep pace with case study on the wards. Because of this, and because of the time limitations already mentioned, the clinical departments have largely abandoned the lecture system.

The virtual abandonment of systematic instruction in clinical subjects left a void in educational procedure. The students found it difficult to understand the complex sequences encountered in their patients; nor has the problem been solved by organizing small discussion groups at the bedside or in the conference rooms nearby. They found it particularly difficult to apply the theoretical knowledge acquired in the basic science departments to individual cases of many types. There was much complaint, both by students and faculty, of faulty "integration" of the program. By the very nature of things, the pathologist has been obliged to assume major responsibility for broad systematic instruction in the theory of disease. Dr. William G. MacCallum, the executive officer of our department in 1909, was one of the first to recognize this. He realized that instruction in pathology had been unduly confined to a description of the anatomical changes of disease, both gross and microscopic. He revised his instruction so as to include a description of the chemical and physiological changes which occur in the course of disease. His textbook of pathology, first published in 1916, established new standards of integration —standards which have ben adopted by most of those who have written pathology textbooks subsequently. His successors in the department have maintained the tradition, and the tradition has steadily gained headway in other departments of pathology throughout the country. If the theory of disease is presented in this comprehensive and systematic manner, the student finds little difficulty in adopting the case method in the clinical years which follow. The individual patient presents the opportunity to apply this systematic information and to master the "art" of medical practice.

Professor Joseph E. Flynn, associate professor in the department, has accepted an appointment as professor and head of the Department of Pathology at the University of Missouri.

During the past year Professor Flynn and Professor Robert W. Coon

have made considerable progress in the purification of factors involved in blood coagulation. They have used these products in their studies of the reaction mechanics of coagulation. They have also used them in the development of assay procedures for each of the factors in question. These new assay procedures are of great value in studying the fluctuations in animal experiments. They have also used these techniques in the study of human "bleeders," in order to ascertain the nature of the disturbances and the responses to treatment.

Professor Wellington B. Stewart, in collaboration with Dr. S. Raymond Gambino, has made progress in determining the rate constants for absorption of iron from the gastrointestinal tract of the dog. Studies of factors which may increase iron absorption are under way. These studies have been made possible by the development of a new method based on simultaneous use of two radioactive isotopes of iron.

Professor Stewart and Professor Maurice E. Shils of the School of Public Health have continued their study of fatty accumulations in the liver and of the relation of diet thereto. These studies suggest the possible existence of additional factors in the lipotropic mechanisms of the body.

In the division of neuropathology, Professor Abner Wolf, in conjunction with Professor David Cowen and Dr. Lester Geller have continued their studies on prenatal factors and their effects on the central nervous system. Dr. Mavis Kaufman is carrying forward the program of study on experimental disseminated encephalomyelitis, in conjunction with Professor Wolf and Professor Elvin Kabat. The same three are also making a report on adult toxoplasmosis, and Professor Wolf and Professor Irwin Feigin are publishing a report on a disease in infants resembling Wernicke's encephalopathy.

The division of neuropathology has been an active center throughout the years for the training of neuropathologists. Dr. Eleanor Roverud is completing her training and has accepted an appointment as neuropathologist to the Wayne County General Hospital, Detroit, Michigan, effective July 1, 1954. She will participate in the instruction in neuropathology at the Wayne University College of Medicine. Dr. John Moosey has accepted a position as neuropathologist, within the Department of Pathology, at the Tulane University School of Medicine.

The division of pediatric pathology has been short-handed, following the retirement of Professor Beryl Paige, who completed a twenty-two-year period of service on June 30, 1953. Dr. Dorothy H. Andersen, in the meantime, has been promoted to the rank of associate professor. Plans have been made to restore the staff to normal size—a matter of great importance in view of the heavy work load of teaching and hospital service.

Professor Andersen has continued her studies of celiac disease and cystic fibrosis of the pancreas. She is currently a member of the editorial committee charged with preparation of the report on the study of neonatal deaths in New York City.

Professor Theodore F. Zucker and Dr. Lois M. Zucker have continued studies on 2-acetylaminofluorene and its relationship to the formation of neoplasms in different strains of rats. Their work has emphasized the modifying effects of diet, with reference both to tumor formation and to toxicity of the compound in question. The toxicity which is manifest in animals maintained on certain purified diets can be minimized through feeding of a "countertoxic" factor found in certain foodstuffs. Much progress has been made in isolating the countertoxic factor.

Professor Henry S. Simms, in his study of arteriosclerosis, reports that emulsified cholesterol combines with the "anti-lipfanogens," thus permitting the "lipfanogens" to cause deposition of ordinary lipids in vessel walls. This role of cholesterol is thought to be fundamental in the causation of arteriosclerosis. It is true that cholesterol itself is often deposited in the vessel walls along with these lipids. However, the role of cholesterol is thought to be incidental and secondary.

Recognizing the importance of lipfanogen, Professor Simms has developed methods for isolation of the active material from serum. It has already been possible to secure a fraction almost one hundred times as potent as the crude serum proteins with which it is associated.

Doctor Benjamin N. Berg, working in association with Professor Simms, has reported the anatomic lesions found in a colony of aging rats. They are seeking to formulate the principles of longevity in general terms of constitutional factors and disease patterns.

Doctor Hans Kaunitz has concluded that materials present in rancid lard obscure the biological effects of vitamin A. He has also shown that dietary deficiencies in pyridoxine, pantothenic acid, or riboflavin are less harmful if the protein content of the diet is maintained at low levels. A deficiency in thiamine, however, is aggravated by reduction of dietary protein, probably because the reduction in protein is accompanied by corresponding increase in carbohydrate, and this, in turn, increases the requirement for thiamine.

The report on the Department of Pathology would not be complete without a brief statement regarding the numerous activities of the division of the department located in the cancer hospital—the Francis Delafield Hospital. Professor Arthur Purdy Stout has collaborated with members of many departments in his study of neoplasms. It is a pleasure to announce that he was the recipient of the Lasker Award for 1954, in recognition of his many contributions on the nature and control of cancer.

Professor Edith E. Sproul has likewise contributed in an outstanding manner to the coordinated activities so characteristic of all departments at the Francis Delafield Hospital. This includes teaching and service functions, as well as research. In collaboration with Drs. Martin Blutinger and Silvio Fiala she has conducted a study on the subcellular particles of normal and tumor cells, using differential centrifugation, histochemical techniques, and electron microscopy. Attention is being given particularly to mitochondria

and microsomes in the evaluation of the cancer cell. These three investigators are also conducting studies on the effects of intravenous injections into normal animals of malonic acid, which is an inhibitor of succinic dehydrogenase.

DEPARTMENT OF PEDIATRICS

Professor Rustin McIntosh, Executive Officer

In December Professor Richard L. Day resigned in order to accept the position of chairman of the Department of Pediatrics at the State University of New York College of Medicine in Brooklyn. Other resignations, likewise received with regret, are those of Professor Annie V. Scott, Professor Jerome L. Kohn, and Dr. Lloyd S. Saltus.

Among the full-time staff, Dr. Paul H. Boyer holds the appointment of research assistant assigned to a special project in pediatric pathology. In the part-time staff, Dr. Mary H. Samuels has been reappointed as assistant. New appointments in the same academic grade are those of Dr. Lawrence J. Cassard, Dr. Harvey H. Corman, Dr. Daniel J. Melia, Dr. Mabel Ross, and Dr. Robert C. Wheeler. Dr. Robert J. Imrie and Dr. James R. MacLean were assigned to pediatric pathology as assistants. At Mt. Sinai Hospital Dr. Donald Gribetz and Dr. Avron Y. Sweet were appointed instructors.

No important change has taken place in the teaching schedules or policies as compared with the previous academic year. Further experience with the tutorial form of instruction in the third year clearly demonstrates that the improvement in effectiveness of the instruction given is purchased only at the cost of a huge increase of instructor-hours. Teachers as well as students, however, clearly prefer the current program over the lecture type of teaching largely employed prior to 1951 in the pediatric curriculum, and would regard a return to the old regime as a pedagogic retrogression. The pediatric staff deserve full recognition for their willingness to meet the increased demand on their time, an increase which is in no effective degree counterbalanced by the relatively slight reduction in staff hours called for by the current fourth-year curriculum. Due credit must be given also to the excellent cooperation of Professor Horace L. Hodes and his staff at Mt. Sinai Hospital, who have assisted the program by providing stimulating instruction to regularly assigned students.

Since the pediatric teaching staff, and especially its full-time members, have looked on their work with undergraduate students as having first claim on their time and efforts, the research activities of the department have been correspondingly hampered. A comparable deterrent influence of routine load is detectable in the scope of operations of the division of pediatric pathology, in which a reduced staff of trained pediatric pathologists finds itself confronted with a considerably augmented work load in numbers of autopsies

and of surgical specimens requiring interpretation, as well as in increasing complexity of the methods of investigation involved. Nevertheless, a certain amount of work along new lines has been achieved.

Professor Dorothy H. Andersen has continued to direct studies of celiac disease and of cystic fibrosis of the pancreas. Dr. Virginia N. Wilking has studied the psychological and emotional impact of pancreatic fibrosis on the patient and on his family. She has more recently received a fellowship grant from the National Foundation for Infantile Paralysis to enable her to pursue an analogous investigation of the emotional aspects of rehabilitation therapy in poliomyelitis patients, especially in respirator cases. Dr. Paul H. Boyer has subjected a large body of historical data in celiac disease and cystic fibrosis of the pancreas to genetic analysis, searching for constitutional links between these two important components of the celiac syndrome. Dr. William A. Silverman collaborated with Professor Andersen in a clinical and anatomic study of the effect of inhalation of medicated mist on the pulmonary tissues of premature infants. Professor Paul A. di Sant'Agnese's analysis of the inorganic content of sweat, saliva, and other bodily secretions continues to yield new facts of importance in the pathologic physiology of pancreatic fibrosis and in our concept of the underlying disease process. Studies are under way, in collaboration with Professor Zacharias Dische of the Department of Biochemistry, to analyze mucoproteins of various secretions recovered from patients with pancreatic fibrosis. And in association with Dr. Michael J. Lepore of the Department of Medicine, Professor di Sant'Agnese has continued investigations into the relation between idiopathic nontropical sprue in adults and idiopathic celiac disease in children.

Professor Alexander and her group are pursuing a number of projects in microbiology related to clinical pediatrics. With Miss Grace Leidy she has continued her investigations of the biology of *Hemophilus pertussis* and with Professor Stephen Zamenhof of the Department of Biochemistry, her study of the control of inherited traits of bacterial cells. Dr. Isabel M. Mountain and Dr. Katherine Sprunt are collaborating with her in experiments to achieve a genetic control of modification of poliomyelitis viruses. Dr. Douglas S. Damrosch has participated in an investigation of the factors which influence the results of therapy of meningeal and miliary tuberculosis.

Dr. Ruth C. Harris continues studies of liver derangement in infants and children, several aspects of which are going forward simultaneously: observations of the biochemical disturbance in obstructive jaundice; studies of the enzyme glucose-6-phosphatase in liver and kidney; measurements of bromsulfalein excretion associated with simultaneous estimates of blood volume; and observations of amino acid excretion in a variety of conditions which affect liver function.

The collaborative study of fetal injury in which the Departments of Obstetrics and Pediatrics hold a joint interest has gone forward under Dr. Mary Richards' direction. As a special project of this general study Professor John

Caffey, in association with Dr. Garry deN. Hough III and Dr. Charles T. Ryder of the Department of Orthopedic Surgery, has undertaken the collection of basic measurements of growth and development of the hip joint in infancy with a view to improving the early recognition of congenital dislocation of the hip. As an offshoot of the water fluoridation study being carried out in the towns of Newburgh and Kingston, Professor Caffey has had an opportunity to measure normal variations in the bones of the knees in a large number of healthy children.

Professor Conrad M. Riley, in collaboration with Professor Beatrice C. Seegal of the Department of Microbiology and with Dr. Ruth A. Davis, has been studying nephritis produced in experimental animals by injection of nephrotoxic serum. Under Professor Riley's leadership, a group representing various specialties and including Professor William S. Langford from the Department of Psychiatry and Dr. Alfred M. Freedman has continued to investigate familial dysautonomia, a rare disease of genetic origin which has complex and baffling psychodynamic implications.

Dr. James A. Wolff and Dr. Audrey K. Brown, the latter holding the L. Emmett Holt Fellowship, have set up a research laboratory for the study of problems in hematology and have made a number of observations relating to the distribution of different types of hemoglobin in a variety of clinical conditions.

Among honors achieved by members of the department during the year should be mentioned the conferring of a Goucher College Award on Professor Alexander. She also served on the council of the American Pediatric Society and was elected chairman of the Pediatric Section of the New York Academy of Medicine. Professor Andersen received an Elizabeth Blackwell Award, conferred by the New York Infirmary in recognition of her work as a teacher, clinician, and investigator. Professor McIntosh served as president of the American Pediatric Society, was elected president of the Association for Research in Nervous and Mental Disease, and was made a corresponding member of the British Paediatric Association and a member of the American Academy of Arts and Sciences.

DEPARTMENT OF PHARMACOLOGY

Professor Harry B. van Dyke, Executive Officer

Over a number of years, the department has sought to improve the integrated presentation of pharmacology in the courses for students of medicine and of dental and oral surgery. A major change in laboratory instruction in 1953–1954 was the substitution of demonstration experiments for most of the experiments which students had previously performed. The only experiments undertaken by the students were observations of the action of drugs on isolated organs; such experiments almost invariably yielded worthwhile

results within the time limits imposed by the laboratory schedule. The demonstration experiments were designed and presented by the staff at the expense of much time and effort under the leadership of Professor Alfred Gilman. Continuous recording of the electrocardiogram (both on the cathode-ray oscillographic screen and by permanent records), the heart sounds, the systolic and diastolic blood pressures, and the respiratory rate and minute volume enabled the students to observe without interruption how the vital cardiovascular and respiratory functions are modified by drugs. Special experiments elucidated the effects of drugs on cardiac output and on neuromuscular physiology. Each session was preceded by explanatory remarks and followed by a discussion of the results, which lost none of their pedagogic value when they were unexpected or unusual.

Aspects of the program of instruction of students of dental and oral surgery were further developed by Professor Herbert J. Bartelstone, whose special qualifications made possible a strengthening of the laboratory instruction of these students in fundamental pharmacology. As a result, the students were better able to integrate this knowledge into their concepts of dental science and practice. Particular emphasis was laid on groups of drugs of special importance to the clinical careers of these students.

Dr. Frederick G. Hofmann joined the staff as an associate and participated continuously in the program of instruction. Dr. Paul B. Brazeau took special responsibility for the development of the rather elaborate apparatus required for the new demonstration experiments. As in previous years the department is in debt to Professor Virginia Apgar of the Department of Anesthesiology and to Dr. John R. West of the Department of Medicine for their generous cooperation in demonstrating clinical aspects of pharmacology. Professors Gilman and Hamilton H. Southworth of the Department of Medicine in association with others planned and presented the course in applied pharmacology as a joint project of the Departments of Medicine and Pharmacology.

Dr. Karlis Adamsons, Jr., and Mr. Sanford L. Engel, working with Professor Harry B. van Dyke, studied the sites of formation and storage of the hormones of the neurohypophysis. This research required the development of elaborate and extremely sensitive methods of assaying the hormones biologically. The hormones of the hypothalamus, where their formation is presumed to occur, vary greatly with respect to amounts stored. Oxytocin is always present in smaller quantities than the vasopressor-antidiuretic hormone. Although recent work of others suggests that the vasopressor and antidiuretic principles are different, the present studies support the current view that they are identical.

Professor Alfred Gilman, in collaboration with Dr. Paul Brazeau, has continued studies on the renal tubular transport of electrolyte. Convincing evidence indicates that bicarbonate reabsorption is achieved by the renal tubular secretion of hydrogen ion. Indeed all the renal tubular functions associated with the conservation of available fixed cation are believed to depend upon

hydrogen ion transport. Evidence has also been obtained to support the view that most of the potassium ion present in the glomerular filtrate is reabsorbed along with other cations and that secretory transport regulates potassium homeostasis. Mr. Alan R. Koch, in association with Professor Gilman and Dr. Brazeau, has been investigating the interrelationship of sodium and potassium excretion by the kidneys. These various investigations of the renal control of electrolyte conservation and excretion have been supported by a grant from the National Institutes of Health of the United States Public Health Service.

Professor Bartelstone has continued his work on the use of radioactive isotopes in investigations of the permeability to and transport of anions by the teeth. He pointed out the great practical importance of the cardiotoxic properties of trichloroethylene, which has received endorsement as a pain-relieving drug in dental operations.

Dr. Hofmann, in connection with his investigation of the hormones of the adrenal cortex, studied the disposal of excessive doses of water by the kangaroo rat. The kangaroo rat, a desert inhabitant, conserves water very efficiently and cannot excrete an excessive quantity with nearly the efficiency of the common laboratory rat. Some improvement in the late phase of excretion follows the administration of cortisone to kangaroo rats. Dr. Hofmann's work on the synthesis of adrenal cortical hormones in vitro was initiated late in the year.

Staff members have given numerous lectures and seminars both in the College and elsewhere. Professor Gilman is on the editorial boards of the *American Journal of Physiology* and of *Pharmacological Reviews*. He also serves as a member of the Pharmacology and Experimental Therapeutics Study Section of the Division of Research Grants of the United States Public Health Service. Recently he was appointed to the Scientific and Advisory Board of the American Foundation for Allergic Diseases. Professor van Dyke continues to serve as a member of the Committee on Growth of the National Research Council. He represented the American Society for Pharmacology and Experimental Therapeutics in the National Research Council.

DEPARTMENT OF PHYSICAL MEDICINE AND REHABILITATION

Professor Robert C. Darling, Executive Officer

Specialists in various areas have turned their attention to the management of chronic permanent disabilities and to the factors which increase the living potentials of the sufferers in these categories. In a sense, this may be considered as recognition that rehabilitation is a problem for all physicians. At the same time, it has become apparent that the complexities of this phase of patient management require a group of physicians whose primary interest is

rehabilitation and who are trained to utilize to the best advantage the tools of physical medicine as well as the psychological and vocational aids of the medical ancillary groups and of the community.

Bringing to the undergraduate student an awareness of the scope of rehabilitation is at present the maximum practical goal in his already crowded schedule. As in the past, the emphasis has been on collaborative teaching with other departments, wherein a comprehensive approach to the management of chronically disabling diseases is presented. Plans are under way to introduce next year a special session on the use of community services outside the hospital toward rehabilitation. For students with special interest in the field, an elective clerkship is offered. The generous stimulus of the National Foundation for Infantile Paralysis in granting subsidy to two students in each medical school has aided this program. The program of residency and fellowship training continues to be the major teaching effort for physicians.

Two more offerings of a postgraduate course in cerebral palsy were given in the past year. This intensive course, under a grant from United Cerebral Palsy Associations, Inc., is given to physicians for three weeks and to physical and occupational therapists for nine weeks. This year six physicians, nine physical therapists, and seven occupational therapists completed the courses. These students came from six foreign countries and from widely scattered areas in the United States. The wide geographical distribution is important because the scarcity of trained workers in this field is most acute outside the large metropolitan centers of the United States. Even greater attendance is expected at future offerings of this course, now that academic credit is awarded to the therapists taking it. As a part of this course, we have been fortunate in bringing to the Medical Center several well-known national figures whose lectures were made open to all interested workers.

The Institute for the Crippled and Disabled again made broad educational contributions, in addition to its many supportive efforts to the departmental training programs for physicians and therapists. An all-day program on the economic aspects of rehabilitation was presented to compensation insurance workers and physicians. These meetings are now established as a regular annual offering and are gaining steadily in their enthusiastic reception by the insurance workers. With the collaboration of Teachers College, the Institute is also offering a June workshop in rehabilitation, which is aimed at teaching the group approach to rehabilitation to a wide variety of professional workers in the field.

Professor Robert C. Darling has continued collaboration with Paul A. di Sant'Agnese of the Department of Pediatrics on sweat abnormalities in fibrocystic disease of the pancreas. Professor Darling is also finishing a study, under contract with the Veterans Administration, on the possibility of creatinuria in amputees. Results indicate that amputation in itself does not cause sufficiently dystrophic changes in muscles to produce creatinuria.

Dr. Shyh Jong Yue has completed a study of cerebral palsy in twins. The

finding of identical clinical pictures in the identical twins of the series points up the importance of lesions in very early development in such cases. Dr. Milos J. Lota is studying the effects of ultrasonic energy both in selected clinical conditions such as hypertrophied and painful scars, and in vitro on red cell suspensions.

Professor Edward E. Gordon is studying the metabolism and energy expenditure of disabled patients with various forms of abnormal gaits. Such studies will be of practical help in planning activity programs of known physical stress for these patients and may contribute fundamentally to our knowledge of exercise stress of bizarre or localized character. Professor Gordon finished a study with similar techniques of various activities in convalescent tuberculosis. He is beginning an additional program of studying abnormal gaits by surface electromyography.

Professor William B. Snow is currently president of the American Congress of Physical Medicine and Rehabilitation. He was on sabbatical leave from the University from October, 1953, to April, 1954. He continues in his multiple advisory capacities to educational and medical organizations concerned with the problems of handicapped children and adults. Professor Darling is chairman of the Committee on Advances in Education of the American Congress of Physical Medicine and Rehabilitation. Professor A. David Gurewitsch was chairman of the session on physical medicine of the 1954 meeting of the New York State Medical Society. Professor Morton Hoberman is president of the New York Society of Physical Medicine and has been advanced to principal physician of physical medicine at the New York State Rehabilitation Hospital, West Haverstraw, where in addition to his clinical responsibilities he is beginning a research study in muscular dystrophy. Dr. Cassius López de Victoria, as executive director of the Latin-American Congress of Physical Medicine, helped to organize and conduct its annual meeting held in Medellín, Colombia, in February.

OCCUPATIONAL THERAPY

The academic year opened with a total of seventy-two students, of whom twenty-six were in clinical affiliation. Of the forty-six students in residence, six withdrew by the end of the first semester because of lack of finances or changes in professional plans. Of the group in clinical affiliation, twenty successfully completed the registration examination of the American Occupational Therapy Association and one failed. Nineteen examinees passed in the top half of the examination group. A recent analysis of the last four examinations indicates that this school is in fifth place as compared with the graduates of the other twenty-six schools.

There is a continuing downward trend in the number of applications for admission. By June 1, fifty applications had been received for admission in September of 1954 as compared with sixty-two at the same time last year and

seventy-three the year before. There is a clear indication that a major cause for this trend is the need for financial assistance by potential students to whom no source of scholarship support is available.

While the over-all pattern of the curriculum has remained unchanged, there have been some major improvements in individual courses. The course in clinical psychology was completely revised to emphasize defense mechanisms, clinical tests and measurements, understanding of test findings, their uses and limitations. The course covering medical and surgical conditions was coordinated into a single unit. An additional section was added to the course on application to orthopedic and neurological conditions in order to give laboratory practice in the treatment of upper extremity amputees, in the use of daily-living activities, and in the fabrication of functional splints. The course in orthopedic conditions was moved from the Institute for the Crippled and Disabled to the Medical Center where a wider variety of clinical material is available for demonstrations.

Clerkships have continued to be a highly effective teaching method and several other occupational therapy schools are inaugurating a similar procedure. Seven institutions in New York are contributing to this program, including a new affiliation this year with Fountain House, an outpatient center of the New York State Department of Mental Hygiene. During the year thirty-nine students have received clinical training in thirty-eight different hospitals or agencies.

The Misses Marguerite Abbott and Virginia Kilburn and Professor Marie Louise Franciscus will attend the first World Congress of the World Federation of Occupational Therapists in Edinburgh, Scotland, in August, 1954. Professor Franciscus will represent the United States on a panel relating to the education of occupational therapists. Miss Abbott has been invited to attend the International Congress of the Welfare of Cripples at The Hague, Holland, as a representative of the United Cerebral Palsy Associations, Inc.

During the year several members of the staff held important offices in various local and national societies and served in editorial and consultative capacities.

PHYSICAL THERAPY

During the academic year a total of forty-seven students were enrolled: twenty-one with advanced standing, thirteen as seniors, and thirteen as juniors.

The clinical practice training period which was formerly three months for the advanced standing students, is now four months. Greater time has been devoted to the teaching of the care and treatment of cerebral palsy through the kind assistance of Mrs. Isabel Robinault and Miss Helen Spencer.

Scholarship support has been obtained by sixteen students from various sources including the National Foundation for Infantile Paralysis, the Veterans Administration, the Elks National Foundation, the United States Air

Force, and the United States Navy. It should be noted that many students are working part-time in order to meet financial obligations. The need for financial assistance to deserving students is apparent. The Physical Therapy Alumni Association has been concentrating its efforts on increasing its membership and ultimately hopes to have funds available for loan or scholarship to our students.

Professor Mary E. Callahan is chairman of a committee to survey existing educational programs for physical therapists for the American Physical Therapy Association.

DEPARTMENT OF PHYSIOLOGY

Professor Magnus I. Gregersen, Executive Officer

In January, Professor John L. Nickerson returned from duty with the United States Office of Naval Research in London, England. Dr. Shih-Chun Wang has been advanced from associate professor to professor. Professor Thomas H. Allen is spending his sabbatical leave as consultant in physiology to the FOA Mission in Taiwan. Professor Allen's teaching duties with the medical students were taken over during the spring by Dr. David Opdyke, formerly professor of physiology at Western Reserve Medical School in Cleveland and now a member of the Merck Institute for Medical Research, Rahway, New Jersey. Professor William W. Walcott was on sabbatical leave during the fall. Dr. Vincent V. Glaviano has resigned to become research fellow of the Life Insurance Foundation and will work with Professor René Wégria in the Department of Medicine. Dr. Hubert S. Sear has also resigned. Dr. George M. Sisson, National Research Council Fellow, has accepted a position as assistant professor of physiology at the University of Rochester School of Medicine. Dr. Arthur S. Cain was appointed assistant in physiology in September. Professor Nickerson was elected a Fellow of the Royal Society of Medicine. Professor Walter S. Root has been elected president of the New York State Society for Medical Research; Professor William L. Nastuk is continuing as treasurer of the society.

A number of changes were instituted in the medical course in physiology as part of a long-range plan to try out gradually various modifications which have been contemplated for some time. For instance, through the cooperation of the Department of Biochemistry, time was made available to introduce much-needed laboratory exercises pertaining to blood gases. Laboratory work, in general, was arranged to allow for more frequent group conferences in the laboratory in order to review results and to consider their implications while still fresh in the students' minds; some exercises were replaced by demonstrations. The staff is by no means unanimous in its opinion of the extent to which demonstrations can effectively replace the more costly and somewhat less elaborate experiments performed by the students themselves.

The laboratory manual was completely revised during the fall after reviewing the present content of the other courses in the basic medical sciences. By common agreement with the Department of Biochemistry, the thesis requirement was temporarily dropped in order to allow greater freedom and more time to carry out the various changes in the teaching arrangements.

Professor Nastuk has been investigating the effect of variations in the extracellular electrolyte composition on the depolarizing action of acetylcholine at the end-plate membrane and has found that removal of NaCl virtually abolishes the depolarization produced by applied acetylcholine. The effect of anion substitution on neuromuscular transmission is also being studied. In collaboration with Arthur Glaubach, a medical student, Professor Nastuk is analyzing the plasma of patients for the presence of curariform substances. With the support of a grant from Hoffman-LaRoche, Incorporated, the study of certain clinically important quaternary nitrogen compounds was continued.

Under a grant from the United States Public Health Service and in collaboration with Dr. Shih-hsun Ngai of the Department of Anesthesiology and Mr. Robert G. Grossman, Professor Wang has ascertained the extravagal hypotensive action of various veratrum alkaloids and has found the site of action to be the carotid baroceptors. The repeated discharges from these receptors give rise to a persistent low systemic arterial pressure. In collaboration with Dr. Glaviano, Professor Wang has investigated the antiemetic properties of chlorpromazine. The evidence indicates that with small doses it acts specifically to block the chemoceptive emetic trigger zone, and in large doses the vomiting center is also depressed. Under a contract from the United States Air Force, Dr. Herman I. Chinn, of the School of Aviation Medicine, Randolph Field, and Professor Wang have found that vomiting following total body radiation does not occur in dogs with chronic ablation of the chemoceptive emetic trigger zone. This evidence indicates that the trigger zone is stimulated for the production of emesis following irradiation.

Professor Root and Drs. Sisson and Cain have completed the investigation of the effect of section of the buffer nerves on red cell volume in dogs. At the termination of the study on each dog, the buffering capacity of the circulation was tested to evaluate the completeness of the surgical denervations.

Paul Mooring and John Rathe, first-year medical students who were granted summer research fellowships, are collaborating with Dr. Root on the problem of improving the methods for testing drugs by using blood volume rather than body weight as the basis for dosimetry. Professor Nickerson and Dr. James A. L. Mathers of the Department of Medicine, while continuing clinical studies with the ballistocardiograph, have turned their attention to its application to animal experiments.

Dr. Nurettin Deniz, research fellow of the Life Insurance Foundation, has been working with Professor Gregersen on factors affecting the bleeding volume in dogs, utilizing a simple apparatus which records arterial pressure

simultaneously with the amount of bleeding. It has been found that the bleeding volume determined five to eight times in rapid succession is remarkably consistent provided the resuscitation by reinfusion of the blood is carried out promptly. Further tests on splenectomized dogs in which blood volume changes have been measured with the T-1824 and P^{32} methods indicate that this bleedout technique is a promising tool for the investigation of a number of circulatory problems.

Professors Allen and Gregersen, in collaboration with Mr. Richard Walzer, a medical student research fellow, and Kirsten Gregersen, a student at Barnard College, have investigated the resistance of the splenectomized dog to hemorrhage. The results demonstrated clearly the advantages of the splenectomized over the normal dog for the study of hemorrhage and revealed a consistent relation between the bleeding volume and the true total blood volume, not found in reports of earlier studies on dogs with spleen intact. The exploration, interrupted two years ago, of a simple method for determining lean body mass by application of Boyles Law is being resumed by Professor Walcott with the collaboration of Mr. Lewis Arnow, a medical student working on a student research fellowship. Dr. Sear has been working on the separation of pure dog albumin for tagging with I^{31} and compared its volume distribution with that of T-1824. He has also devised an improved method of designing electrical transformers. Dr. Cizek has completed the study of the total water content in an extensive series of common laboratory animals, with special reference to the amount of fluid contained within the gastrointestinal tract. The study of the daily food and water ingestion of laboratory animals has been extended to observations on the fluid exchanges during food deprivation. Unlike the dog, whose fluid intake decreases sharply during starvation, the rabbit and guinea pig tend to develop polydipsia and polyuria.

One of the older carbon monoxide methods is being retested and modified by Professors Allen and Root with a view toward developing a precise and simple means of determining CO in small volumes of either blood or air.

Professor Gregersen is continuing investigation of the physiological effects of X irradiation under a grant from the United States Public Health Service. The long-term effects of X irradiation on blood volume and erythropoiesis are being studied in monkeys, and Dr. Larissa Skvorcov-Lukin is investigating various circulatory changes in irradiated dogs. Professor Gregersen and Dr. Charles J. Pallavicini have extended the investigations of the water, lipid, and electrolyte content of brain tissues, and Pier Mancusi-Ungaro, a medical student, is studying the N^2 content of selected brain areas. Recent experiments reveal that drastic alterations in fluid balance have relatively slight effects on the composition of brain tissue. Swelling and shrinking of the brain as observed by the neurosurgeon seem to be unrelated to alterations in water content of the brain substance.

DEPARTMENT OF PSYCHIATRY

Professor Irville H. MacKinnon, Acting Executive Officer

Dr. Nolan D. C. Lewis, professor of psychiatry and executive officer of the department for the past seventeen years, resigned on September 1, 1953. He is serving as director of research in neurology and psychiatry of New Jersey Hospitals and Agencies. Pending the appointment of a new executive officer, the department did not make any radical changes and continued with the programs as presented in the annual report of the previous year. On July 1, 1954, Dr. Lawrence C. Kolb will become professor of psychiatry and executive officer of the Department of Psychiatry and director of the New York State Psychiatric Institute.

The undergraduate medical students serving their clerkships with Professor Robert B. McGraw at Vanderbilt Clinic have had some modification of the teaching method during the past year. A special room with a two-way mirror has been utilized so that the student could observe the patient-doctor relationship and could have first-hand information on methods of interviewing, the development of rapport, and the handling of the therapeutic situation. The method of group therapy for psychiatric patients has been demonstrated by Dr. Hugh Mullan.

Professor William S. Langford has been given some additional hours for the teaching of child psychiatry in the fourth year. The course will stress the practical application of psychiatry in the everyday problems of child-parent relationships.

Professor George E. Daniels has continued to direct the teaching of psychosomatic medicine for both the undergraduate medical students and the postgraduate students of the Psychoanalytic Clinic for Training and Research. Fifteen hours of combined lecture and case discussion of psychosomatic problems have been added to the third-year psychiatric teaching program. Dr. Kenneth Kelley has supervised the arrangement of fifteen hours of clinical clerkship in psychosomatic medicine on the wards of the Presbyterian Hospital for the third-year students.

Drs. Seymour Perlin, John Cook, and Kathryn Prescott are making a survey of eighty-six cases of anorexia nervosa—persons who had formerly been patients at the Medical Center.

A study of the reactions of a group of pre- and postoperative surgical patients to anesthesia is a combined project with the Department of Anesthesiology. Drs. Edward J. Hornick and Harvey Corman are representing the psychosomatic division.

Dr. Ruth Moulton is continuing her study in the Dental Clinic on patients complaining of facial pain and spasms of local muscle groups.

The training and research programs at the Psychoanalytic Clinic for Training and Research moved ahead in a gratifying manner this year. Dr.

David M. Levy returned from the Institute for Advanced Study at Princeton to inaugurate a research methodology symposium which is open to both students and staff. Drs. H. Donald Dunton, Alvin I. Goldfarb, Joseph Lubart, and Robert A. Senescu joined the staff.

Several members of the staff participated in the residency training program at the Psychiatric Institute, the Manhattan State Hospital, and the Kingsbridge Veterans Hospital. Dr. James Cattell was assigned the psychiatric lectures to the second-year dental students. Previously the course was given to both the medical and dental students, but it was felt that a course especially designed for dentists was needed.

Dr. Bernard Glueck, Jr., was assigned to give the mental hygiene lectures and seminars in the School of Public Health.

Professor Sandor Rado has been concentrating his research interest on a study of schizophrenic patients. Several members of his staff have been contributing toward his investigation, which is about ready for final formulation and evaluation.

The department accepts with deep regret the resignation of Professor John A. P. Millet who has served for nearly ten years in the psychoanalytic school and the psychosomatic division at Presbyterian Hospital.

The New York State Psychiatric Institute made one new assignment to its research and teaching staff: Dr. I. H. Scheinberg, assistant professor of medicine, was appointed on July 1, 1953, as principal research scientist in internal medicine at the institute.

Professor Franz J. Kallmann has been appointed one of the directors of the American Eugenics Society and a member of the Board of the American Society of Human Genetics. He was also appointed a member of the editorial boards of the *American Journal of Clinical Medicine*, the *Journal of Heredity*, and the *Acta Geneticae Medicae et Gemellologiae*.

Professor Heinrich Waelsch was honored by the presentation of the Neuberg Medal for general accomplishments in the field of chemistry by the Association of European Chemists.

There were four books and thirty-six articles published and sixty addresses given before various medical societies during the year. The research departments of the Psychiatric Institute have also taken an active part in the undergraduate and postgraduate medical school teaching programs.

SCHOOL OF PUBLIC HEALTH

Professor Harold W. Brown, Associate Dean and Director

The student body of the School of Public Health consisted of seventy-six full-time and forty-five part-time students during the current academic year. There were twenty-three students from fifteen foreign countries.

The faculty of the School of Public Health continued to sponsor a series of

forums which are open to all of the students of the School and to the Medical Center community. The authorities who participated in the forums during the year were: Dr. Herman E. Hilleboe, commissioner of health of the state of New York; Dr. Jacques M. May, director of the Medical Geography Department, American Geographical Society; Miss Marion J. J. Wright, associate director, Harper Hospital, Detroit, Michigan; Dr. Paul V. Lemkau, professor of public health administration, Division of Mental Hygiene, Johns Hopkins University School of Hygiene and Public Health; and Dr. Leona Baumgartner, commissioner of health of the city of New York.

During the year the faculty of the School of Public Health thoroughly reviewed all its curricula. Numbers of small related courses have been grouped into larger integrated courses. A general course in principles of administration was organized, which serves as a basis for special administrative courses in hospital administration and public health practice.

In the past several years the number of students matriculated for the degrees of Master of Science in public health education and the Master of Science in sanitary science has gradually decreased. In view of the relatively small classes, it was considered that the efforts and the time of the faculty devoted to these groups were unwarranted, and accordingly these two curricula were discontinued at the end of the 1953–1954 academic year.

Beginning with the 1952–1953 academic year the administrative residency was placed in the middle of the twenty-one months' course in hospital administration. Four months are spent in academic residence, followed by a twelve months' hospital residency and a final four months of academic study. In the spring semester of the current year the first group of hospital administrative students who followed this new curriculum were in academic residency. Following their administrative residency students bring to various class discussions and seminars information, views, and experiences gained in the several hospitals. As a result, the seminars have been unusually stimulating and valuable.

The faculty of the School of Public Health is responsible for the instruction of medical students in preventive medicine and public health. With the decrease in relative importance of communicable diseases and sanitation, emphasis on preventive medicine and public health is gradually changing to include medical care in its broadest sense. During the year the curriculum for the medical students has been entirely reorganized in order to meet the modern trends in the broad fields of public health and medical care.

The facilities of the Washington Heights District Health Center have been extensively utilized for teaching and research during the current year. Professor Michael Antell and his staff have been most active in the teaching program for undergraduate medical students and for graduate students in public health. The Tropical Disease Diagnostic Service, under the direction of Professor Howard B. Shookhoff, has cooperated in clinical instruction in tropical medicine for the graduate students in the School of Public Health.

Joint research projects between the staff of the Tropical Disease Diagnostic Service and the Division of Parasitology have continued.

The faculty has continued its wide participation in local, state, federal, and international health programs. The staff took part in a large number of scientific meetings throughout the United States and in foreign countries as well. As usual a large number of distinguished guest lecturers contributed to our own programs.

INSTITUTE OF ADMINISTRATIVE MEDICINE

At the end of this academic year, three students in administrative medicine completed their two-year program of study. The residency program of each of these students was in fields of his special interest: home care, chronic-disease care, Blue Cross–Blue Shield administration, hospital administration, and hospital and medical care surveys. All three students report that these field experiences were invaluable.

During the year the research program of the institute was greatly expanded. Dr. E. Dwight Barnett concluded the extensive survey of the health and hospital facilities of the city of San Francisco, California, and a report was prepared and sent to the committee responsible for its undertaking. At the request of the Commonwealth Fund, the institute undertook to analyze and evaluate the effect on medical care of the Rochester Regional Health Program from its inception about eight years ago to the present. This program has been under the general direction of Professor Barnett and under the supervision of Professor Henry B. Makover and Dr. Leonard S. Rosenfeld. At the request of a committee from New Brunswick, New Jersey, a survey of the health and hospital needs of that area was initiated. This study is under the general direction of Professor Barnett and the direct supervision of Mr. John P. Delaney.

Professor Leonard J. Goldwater, Dr. George W. Melcher, Jr., and Miss Naomi M. Weiss are making a study of medical care in industry to ascertain criteria for the evaluation of general preventive health services in industry, to ascertain the fields of applicability of such criteria, to determine through use of these criteria the value of preventive health programs to the employee, to the employer, and to the general public health, particularly in relation to nonoccupational illness, and to evaluate the effectiveness of the different types of prepayment programs found in industry.

DIVISION OF BIOSTATISTICS

In September Professor John W. Fertig returned from a five-month leave of absence. During that time he participated in teaching and consulting duties for the Pan-American Sanitary Bureau of the World Health Organization in the medical school and the Inter-American Center of Biostatistics in

Santiago, Chile; in the medical school in Montevideo, Uruguay; and in the medical school of the University of Puerto Rico. He was instrumental in instituting courses in medical statistics in the medical schools in Chile and Uruguay. He was awarded an honorary doctor's degree by the Faculty of Medicine of Montevideo.

Professor Fertig and Dr. John E. Silson gave a series of lectures on research methods to the Department of Physiology of New York University. Professor Neal W. Chilton and Professor Fertig have continued their studies on the adaptation of certain statistical techniques to dental research problems. Professor Fertig has continued his close cooperation with the Family Health Maintenance Demonstration at Montefiore Hospital and with Dr. Bissell B. Palmer, president of Group Health Dental Insurance, in his attempts to measure the dental needs of an adult working population; and with Dr. Leon Buchbinder of the New York City Department of Health in the assessment of various media for determining the coliform content of milk. Dr. Silson and Professor Fertig are actively participating in a study on the treatment of nonspecific urethritis conducted by the United States Army.

The division has continued to give frequent consultation to research workers of the Medical Center. It has participated very actively in some of the projects, including the radiation-sickness study of Professor Morton M. Kligerman of the Department of Radiology, the study of Dr. William A. Silverman of the Department of Pediatrics on the evaluation of premature mortality rates, and the assessment by Dr. James A. L. Mathers of the Department of Medicine of the reliability of the ballistocardiograph in estimating cardiac function.

DIVISION OF EPIDEMIOLOGY

The hypertension project, in cooperation with the Bureau of Applied Social Research, financed by the Commonwealth of Massachusetts, has continued. Critical appraisals of the literature on blood pressure measurement, hyperreactivity, and psychological aspects are now complete. Mr. Henry L. Lennard completed the appraisal of the psychologic literature and has made progress in the appraisal of the sociologic literature concerning hypertension. Reviews on constitutional and hereditary factors are being made by Professor Robert L. Vought and Mr. Jacob Katz. Field studies on blood pressure measurement and hyperreactivity were designed, and analyses of data collected are in progress.

Mrs. Anna C. Gelman is continuing her work on the agar tube vitamin assay method with Professor Maurice E. Shils. Professor E. Gurney Clark continued active participation in the analysis of the data on untreated syphilis in Norway. Professor Vought designed a study on syphilis prevalence in Buffalo, New York, which was made by the Erie County Department of Health.

Professor Clark has continued to serve as a member of, or consultant to,

many important national and international groups concerned with epidemiology and venereology.

DIVISION OF OCCUPATIONAL MEDICINE

Professor Leonard J. Goldwater and Dr. Beatrice Mintz are studying the occupational aspects of rheumatic diseases. This work is supported by the New York Chapter of the Arthritis and Rheumatism Foundation. Professor Goldwater is continuing his researches on the effect of employment of the course of heart disease with the financial support of a grant from the National Heart Institute of the United States Public Health Service.

Professor Goldwater continues as chairman of the Cardiac-in-Industry Committee of the American Heart Association and as consultant to many national and international agencies.

Professors Shils and Wellington B. Stewart of the Department of Pathology are continuing their attempts to produce the analogue of human Kwashiorkor disease in the rat. Among other changes which have been noted in the animals on the experimental diets is the development of a fatty liver in which the lipid accumulates initially and preponderantly in the portal areas. This type of fatty liver is similar to that found in children with Kwashiorkor, and major attention has been given to the nutritional factors causing its development and those that can prevent or cure it. The condition can now be produced rapidly and consistently in stock weanling rats. The usual lipotropic substances—methionine, choline, and vitamin B12—are not very effective in the usual amounts under the conditions of their most recent experiments, whereas a mixture of lysine, tryptophan, and methionine will markedly reduce the liver lipids. This project is supported by the National Vitamin Foundation.

Professor Shils and Dr. Daniel Shapiro of the Department of Surgery have continued their cooperative research project on the concentrations of certain vitamins and cofactors in tumors and normal tissues of mice and of patients subjected to surgery. This project is being supported in part by a grant from the United States Public Health Service. Thus far, detailed analyses have been carried out for vitamin B6 and riboflavin. It is hoped that the information obtained will afford insight into the mode of action of hormones and antimetabolites in cancer chemotherapy.

DIVISION OF PARASITOLOGY

Professor Harold W. Brown, Professor Kathleen L. Hussey, and Dr. Kam-Fai Chan have continued their studies on the chemotherapy of enterobiasis. In the past several years they have tested approximately one hundred piperazine compounds against experimental pinworm infections in mice and, as a result, have found that piperazine is extremely active. They have extended their work to human trials and have shown that piperazine hexahydrate is a non-

toxic, safe, effective anthelmintic for *Enterobius vermicularis*. As a result of their work piperazine was approved by the Food and Drug Administration and now is widely used clinically in the United States. Further screening of other piperazine compounds is in progress in an attempt to find even more effective substances. Professor Brown and Dr. Max M. Sterman have made clinical studies on the effect of piperazine citrate against *Ascaris lumbricoides* of man and have found it to be much more effective than any of the currently used anthelmintics. It would appear that the group of piperazine compounds may open a whole new field of helminth chemotherapy. At present piperazine is being tried against hookworm and whipworm in man. Dr. Chan and Professor Brown have found that piperazine hydrochloride is effective against the adult forms of *Trichinella spiralis* in experimentally infected mice and this material will be used in human *Trichinella* infections when they become available. Professors Brown and Hussey have continued to test new drugs against infections of *Endamoeba histolytica*. These researches are directed toward the finding of a more effective chemotherapeutic agent against intestinal amebiasis.

Professor Roger W. Williams has for two years been conducting investigations on the bionomics of the filth flies of New York City and is initiating a tick survey of Bergen County, New Jersey. In June, 1954, he conducted investigations on the bionomics of medically important arthropods of northern Michigan while at the University of Michigan Biological Station at Douglas Lake, Michigan.

With Dr. Chan, Professors Brown and Hussey assisted the administration of the North Jersey Training School in the control of a severe amebic dysentery outbreak. Laboratory examinations were made on over three hundred patients and personnel, and due to the high infection rate the whole group was treated with several of the newer chemotherapeutic agents. The epidemic was thereby brought under control.

Professor Hussey served as secretary of the New York Society of Tropical Medicine and was responsible for a very interesting and informative series of meetings.

The new University of Puerto Rico School of Medicine was given full accreditation by the Association of American Medical Colleges and their first class was graduated in June. Columbia University has cooperated in the development of this school and, as an expression of gratitude, the University of Puerto Rico conferred the degree of Doctor of Laws, *honoris causa,* on Professor Brown.

DIVISION OF PUBLIC HEALTH EDUCATION

A new course on problems of health education in underdeveloped areas was given by Professor George Rosen and Mr. Alfred Scherzer of Teachers College.

Professor Rosen has been appointed a member of the Technical Committee

of the National Committee on the Aging of the National Social Welfare Assembly. The Technical Committee is concerned with the problem of rehabilitation of employees and preventive health maintenance, and with developing methods for keeping older people employed on a continuing basis and for preventing deleterious effects of degenerative diseases through such preventive measures as seem applicable.

DIVISION OF PUBLIC HEALTH PRACTICE

Professor William C. Spring, Jr., as chairman of a committee under the auspices of the American Public Health Association has continued the planning phase of a study of the existing and potential relationships between curative and preventive medicine. He has also continued an active and varied participation in the Welfare and Health Council of the City of New York as one of the delegates from the College of Physicians and Surgeons.

At the request of the Institute of Local and State Government of the University of Pennsylvania, Professor Margaret W. Barnard made a survey of the Alexandria City Health Department, Alexandria, Virginia. Professor Barnard participated as an examiner in public health administration for the New York State Civil Service Commission and for the Philadelphia Personnel Department. At the request of the Commissioner of Health of the City of New York, Professor Barnard has acted as consultant to the first deputy commissioner in the planning and reorganization of the District Health Administration.

DIVISION OF SANITARY SCIENCE

Professor Alvin R. Jacobson and Mr. Sumner Waitz, a graduate student, are studying the bactericidal effect of the small quantities of fluorides added to water supplies for prevention of dental caries.

Professor Jacobson was on leave of absence during the fourth quarter of the academic year to study public health and sanitation in Chile, Brazil, Trinidad, Venezuela, El Salvador, and Argentina. The traveling fellowship was under the sponsorship of the Pan-American Sanitary Bureau of the World Health Organization. Professor Jacobson discussed sanitation problems before a meeting of the Brazilian-American sanitary engineers in Rio de Janeiro, Brazil.

DEPARTMENT OF RADIOLOGY

Professor Ross Golden, Executive Officer

A number of changes in the professional staff have occurred since the last report. Dr. Solomon S. Schwartz, assistant professor of radiology, resigned to accept the directorship of radiology at the Brooklyn Jewish Hospital. Dr. Alfred Berne, instructor in radiology, resigned as of March 31, 1954, to take

a position as assistant professor of radiology at the State University of New York at Syracuse. Dr. Berne was in charge of angiocardiography for the last two years and did much to develop this form of diagnosis of congenital heart disease. This work is now the responsibility of Professor Russell Wigh. Dr. Frank Reed resigned as instructor in radiology, effective June 30, 1954, to become director of radiology at the Morristown Memorial Hospital in Morristown, New Jersey. Dr. R. G. Bjorn Bjornson resigned as instructor in radiology to take training in traumatic surgery.

Drs. Donald J. Barnett of Baltimore, Joan Eliasoph of New York, and Ralph Schlaeger of Philadelphia joined our staff as instructors in radiology. Drs. Julian Mandell and Robert Bogen, former residents here, were also appointed instructors.

Assistant Professors Josephine S. Wells, Juan M. Taveras, and Russell Wigh have been given associate professorships, effective July 1, 1954.

Professor Ross Golden attended the Seventh International Congress of Radiology held in Copenhagen, Denmark, in July, 1953, as the delegate of the American College of Radiology and as chairman of the delegation from the United States. Following this meeting he visited hospitals in Norway, Sweden, Germany, Switzerland, France, and England. He continues as chairman of the Committee on International Affairs of the American College of Radiology and as the senior representative of this organization on the American Board of Radiology.

Professor Golden will retire as professor of radiology and executive officer of the department in the University, and as director of the Radiological Service of the Presbyterian Hospital, as of September 30, 1954, and will go on leave of absence from June 30. He has been associated with this faculty since 1922.

Dr. Harold W. Jacox was appointed acting executive officer of the Department of Radiology in the University and as acting director of the Radiological Service in Presbyterian Hospital as of July 1, 1954.

Professor Jacox was elected president of the New York Roentgen Society for 1954–1955, following a year of service as vice-president of the society. He is also chairman of the Section of Radiology of the Medical Society of the State of New York. He read a paper at the Seventh International Congress of Radiology, and was invited to be a founding member of the International Club of Radiotherapists, which will meet at each International Congress of Radiology and elsewhere at yearly intervals between congresses. Following the meeting in Copenhagen, Professor Jacox visited various radiotherapy departments in Denmark, Sweden, England, Scotland, and France.

Professor John Caffey has given twelve addresses in various parts of the United States, as did Professors Golden and Jacox and other members of the department.

In March, Professor Morton M. Kligerman presented to the American

Radium Society some investigations he made with Professor Howard W. Vreeland of the School of Engineering of Columbia University on the application of graphics to the localization of radium implants. Together with Dr. Samuel H. Madell, Professor Edith H. Quimby, and Professor David V. Habif of the Department of Surgery, he is investigating the possibility of detection of malignant metastases in the liver by the use of radioactive iodinated human serum albumen. The study of the use of dramamine and pyridoxine in radiation sickness, which was being carried out by Professor Kligerman, Dr. Anna Silverman, Dr. Kent Ellis, and Professor John W. Fertig of the School of Public Health, has been completed. It was found that these drugs are ineffective for this purpose.

With Professor Taveras, Professor Gerhart S. Schwarz is developing a lumbar puncture needle for myelography which will facilitate the removal of contrast material from the spinal canal. The slide rule designed by Dr. Schwarz for the correction of cephalopelvimetric measurements on X-ray films in pregnancy has been placed on the market by the Picker X-ray Corporation. Under his direction, the X-ray equipment for animal work on the nineteenth floor of the Medical School has been improved by the installation of a Fairchild Camera for making films in rapid sequence. This X-ray equipment is at the service of any department of the Medical School and Dr. Schwarz is available for consultation on the application of X-ray methods of study to experimental problems. During the past year it has been used by the Department of Medicine for the study of dietary changes in the rat's skeleton and for vascular catheterization in dogs. The entire monkey colony of the Department of Physiology was examined for pulmonary tuberculosis. The Department of Surgery has used this equipment for demonstration of the cerebral circulation in dogs.

Professor Wigh is supervising the one-month elective course in radiology for third-year students. This course now includes a week in radiotherapy under the direction of Professor Kligerman, during which the student sees some of the clinical problems in malignant diseases which are suitable for radiation treatment and the techniques which are applied. These students are requested to prepare a thesis on some diagnostic problem in radiology. Ten third-year students have taken this course during the past academic year.

The work of the Radiological Research Laboratory includes two separate activities: the research project for the Atomic Energy Commission and problems allied with therapeutic radiology and with medical uses of radioactive isotopes. The research work carried out in the laboratory under the Atomic Energy project is directed towards the study of problems of special interest to the commission.

Work on the dosimetry of neutrons has continued and considerable progress has been made. More reliable tissue-equivalent ionization chambers have been constructed. The appraisal of the dose component attributable to

gamma rays can now be made better by the use of Teflon ionization chambers in conjunction with the tissue equivalent chambers. Professor Harald Rossi has devised a new proportional counter method for the same purpose, which may provide a very good solution of the problem in more general terms. However, much work remains to be done before the instrument is fully developed.

In recent years there has been considerable uncertainty as to whether the stopping power of water and water vapor for alpha particles was the same (on a mass basis). Mr. R. Hobart Ellis has carried out a difficult experiment on this subject and finds that there is no difference within the limits of experimental error. This is of great theoretical as well as practical interest.

Mr. William Gross has continued work on the measurement of radioisotopes in absolute terms, using a new method developed in this laboratory. He has also carried out experiments on the energy lost by beta rays in producing ions in different gases. Considerable time has also been spent on the calibration of strontium-90 eye applicators and on the measurement of depth doses produced by them.

Mr. Steward Krakauer and Mr. Hugh Byfield have prepared beta-ray standards for the calibration of survey instruments by a new method previously developed in this laboratory. A large number of instruments will be calibrated for the Atomic Energy Commission with these standards in the near future.

Work on the measurement of the radiation dose in a single cell, produced by radioactive material within it, has been continued. This is a difficult problem and many complications have had to be overcome.

Work under the direction of Professor Roberts Rugh in radiobiology comprises studies in protection, tissue hydration, and fertility changes following whole-body X irradiation of animals. Work in progress may be classified under the headings of protection (adult and fetus) against acute and chronic exposures to X rays; fetal sensitivity (eyes and gonads); attempts to reduce tissue intolerance of mice to human tumors by prior X irradiation; and the relation of each of the three phases of estrus to radiosensitivity.

Professor Ludwig von Sallmann of the Department of Ophthalmology and his group have continued their studies on radiation-induced cataracts in rabbits. Some of the experiments were carried out in the Radiation Laboratory of the University of California, this being the only laboratory in which powerful beams of deuterons and alpha particles are available. Drs. John H. Lawrence and Cornelius Tobias kindly offered their facilities for these experiments and cooperated in the work. The results show definitely that these ionizing radiations are much more effective than X rays in producing cataracts.

Mr. Bruce R. Allen and Miss H. Gwendolyn Wardwell have been studying the anemia produced in rabbits by irradiation of the exteriorized spleen only. This effect was first demonstrated in mice by Mr. Allen last year. The present work is directed towards the elucidation of the mechanism.

Dr. Ruth F. Hill has completed a study on the photoreactivation of T_1 bacteriophage under different conditions and together with Dr. Rossi has proposed a theory to account for the results.

Most of the problems relating to clinical use of radioisotopes and to radium and X-ray dosage are supervised by Professor Edith H. Quimby. The radioisotope laboratory receives and standardizes all radioactive isotopes of iodine, phosphorus, gold, sodium, and potassium, and dispenses them to clinical and research departments. In cooperation with the medical, surgical, and radiological departments, regular diagnostic and therapeutic procedures are carried out. The laboratory also cooperates with members of the clinical staff and others in new researches involving the use of radioactive isotopes.

A grant to Professor Quimby from the American Cancer Society, Incorporated, has supported the work of two research assistants on problems connected with radiation dosimetry. Under this grant the work begun last year on dosage calculation for horizontal rotation therapy was completed, a preliminary report was presented at the International Congress of Radiology in Copenhagen in July, 1953, and a definitive report was given at the meeting of the Radiological Society of North America in December. Also, a simpler and more direct method for dosage calculation for vertical rotation therapy has been developed and is ready for publication.

Professor Failla has continued to be active in work with the Atomic Energy Commission and other government agencies on problems related to atomic energy. He is a member of the Advisory Committee for Biology and Medicine of the Atomic Energy Commission, and consultant to several of the AEC installations. He is chairman of the Radiation Instrument Panel of the Armed Forces Special Weapons Project and chairman of the Visiting Committee for the Medical Department of the Brookhaven National Laboratory. Professor Failla is also a member of the International Commission on Radiological Units, the International Commission on Radiological Protection, and the National Committee on Radiation Protection. Professor Quimby is chairman of the Advisory Committee on Isotope Distribution of the Atomic Energy Commission and a member of the National Committee on Radiation Protection. She is a consultant for the American Medical Association, the Veterans Administration, and the National Research Council. Dr. Rossi is chairman of the subcommittee on "neutrons" of the National Committee on Radiation Protection.

Professor Quimby has served as president of the American Radium Society for the past year. Professor Failla is president of the Radiation Research Society. Professors Failla and Quimby both attended the Seventh International Congress of Radiology in Copenhagen, Denmark, in July, 1953. Professor Failla was an honorary vice-president of the congress and presented a paper. Many papers have been published during the year by different members of the staff of the laboratory.

DEPARTMENT OF SURGERY

Professor George H. Humphreys II, Executive Officer

A high level of activity in all categories, without marked changes in staff, organization, or physical facilities, has been the keynote of the past year. The staff lost five men, one through retirement, two through resignation, and two through leaves of absence.

On July 1, 1953, Professor William Barclay Parsons retired after thirty-six years of service to the University. He was one of the small group of teachers associated with Professor Emeritus Allen O. Whipple, who established the structure of the department after the move to the Medical Center. In 1926 he became an assistant and in 1938 an associate professor. In 1949 he was advanced to professor of clinical surgery. A superb technical surgeon, he became interested in thyroid surgery early in his career and was the first of the able group of surgeons whose work in thyroid disease has been an outstanding contribution. Later, with Professor Whipple, he developed the first successful operations for removing tumors of the pancreas. Always an excellent teacher, he set an example for the generation which follows him: the fine balance between gentle, precise, and well-planned operative technique and the broad common sense and understanding of the patient as a whole which marks the well-rounded surgeon.

On September 1, 1953, Professor Joseph J. McDonald resigned as professor of surgery to accept a position as dean of the medical school of the American University in Beirut, Lebanon. He had been appointed in January, 1951, and had taken charge of the surgical service of the Francis Delafield Hospital, and also had acted as coordinating chief of the group of men from the Departments of Surgery, Otolaryngology, Dental and Oral Surgery, and Radiology who worked together in caring for patients with tumors of the head and neck. In this difficult and changing field his work was unsurpassed and his loss is keenly felt. But in accepting a post of greater academic responsibility he represents another "graduate" of whom we are proud.

On January 1, 1954, Professor Frank B. Berry was granted a leave of absence in order to accept the post of Assistant Secretary of Defense for Health and Medical Affairs. To be able to contribute to the defense needs of the nation is a privilege, and to have a man of Professor Berry's insight and good sense guiding a program which has in the past too often had a disruptive influence on academic medicine, is a comfort. But the department has lost an able leader of the two affiliated services at Bellevue which he directed.

On April 1, 1954, Assistant Clinical Professor Con Amore V. Burt resigned. Dr. Burt's contributions to the teaching of proctology and to large-bowel surgery have been real and consistent.

On June 1, 1954, Dr. Robert B. Hiatt began a two-year leave of absence in order to accept the position of chief of the surgical service of the Nemazee

Hospital in Shiraz, Iran. The position was arranged through the Iran Foundation in New York which is responsible for this unique Iranian philanthropy. The project is of special interest to Professor Whipple, whose ties to Iran, his birthplace, have always been close, and who is a member of the Iran Foundation. Though Dr. Hiatt, as a younger member of the staff who has carried a heavy responsibility in teaching, in research, and in patient care, will be much missed, the department is confident of his ability to establish a service in Iran worthy of our standards, and is proud to contribute to this experiment in international good-will.

On July 1, 1953, Dr. Harold G. Barker was appointed assistant professor. On January 1, 1954, Dr. Frederick Herter was appointed instructor.

No changes occurred this year in the undergraduate curriculum in surgery, though the material presented in the second and third years has been modified in order to present within an unchanging time allotment the rapidly increasing content of the subject. In the fourth year, dissatisfaction with the single month clerkship has led to a rearrangement of teaching assignments between the affiliated hospitals and Presbyterian which will give the former the greater measure of teaching responsibility which they wish, and permit a less fragmentary approach to clinical surgery by assuring the majority of the students two consecutive months of instruction in a single institution.

At the graduate level, integration of the residency programs at Bellevue, Mary Imogene Bassett, and Presbyterian Hospitals has continued to prove beneficial, but it was decided to discontinue the Delafield rotation, at least for the time being. The program at the Delafield has been an active one, however, especially in the field of postgraduate education.

As for the laboratories, the animal surgery laboratory, in addition to its usual heavy commitment each spring in second-year surgery, was used for eight different projects within the department, and it also provided facilities for five other departments requiring surgical technical assistance. The departmental activity in this area reflects the increasing interest in problems related to cardiovascular surgery.

Under the direction of Professor Arthur H. Blakemore, Dr. Arthur Voorhees has continued work begun in 1950 concerned with the use of synthetic textile tubes as bridging protheses in arterial defects. During the past year the investigational work supported by the Fund for the Advancement of Blood Vessel Surgery has been directed along three channels: a collection and evaluation of the protheses implanted in the experimental animal over a two- or three-year period, an evaluation of protheses constructed from a variety of textiles, and an evaluation of the clinical application of the techniques in the treatment of aortic aneurysms in man. It now appears certain that this technique is of major usefulness in blood vessel replacement.

Professor Ralph A. Deterling, Jr., has continued his studies of blood vessel grafts, as well as initiating a new series of experiments on the physiological alterations associated with surface cooling on "hypothermia." With Drs. Mary

Parshley and Claude Coleman, a long-term study of the fate of aortic homografts was concluded. With Dr. Shivraji Bhonslay a series of experiments designed to determine the usefulness of vessel grafts stored at low temperatures for long periods, of grafts preserved by freezing and drying, and of certain plastic protheses was begun. Under his direction two other studies were initiated: The effect of anticoagulation on vascular healing was investigated by Drs. Alfredo Rehbein and Peter Weil, and studies of methods for determining portal circulation time were begun by Dr. Nino Masera, a visiting fellow from Turin.

Dr. Ferdinand F. McAllister, with Dr. Julius Jacobson, began a series of experiments to explore new methods of effecting gradual occlusion of major arteries, a problem in the surgery of aneurysms that is still unsatisfactorily solved.

Dr. Hubert Rosomoff, who is completing a year of general surgical assistant residency training as a preliminary to residency training in neurosurgery, carried out with Professor Holaday of the Department of Anesthesiology a study of cerebral blood flow during surface hypothermia. They have found that both cerebral blood flow and cerebral oxygen consumption vary proportionally with temperature during hypothermia, and to the same extent, such that arteriovenous oxygen differences are unchanged; therefore, hypothermia probably produces no hypoxia of brain tissue so long as adequate respiratory and cardiac functions are maintained.

Dr. David Ju completed his investigations of phenomena of lymphatic flow by means of radioactive isotope techniques, especially in relation to neoplastic or surgical lymphatic block. Dr. Samuel Powers studied fundamental flow properties of blood, in which he demonstrated the exceptional nature of blood as an "imperfect" fluid to which hydrodynamic laws of fluid flow do not apply. This work was closely related to his previous development of a simplified method for determining blood volume, cardiac output, and anomalous circulatory shunts by means of the isotope dilution technique, a method which has proved extremely valuable in the diagnosis of congenital cardiovascular anomalies, as well as in evaluating the circulatory status of patients suffering from acquired heart disease, hemorrhage, shock, or other abnormal circulatory states.

Dr. Robert Holliday initiated a study of the application of ultrasonic methods to the measurement of blood viscosity in its liquid and clotting states by means of an instrument known as the ultraviscoson. It is hoped that a method may be developed to study blood while it is circulating in the body and that thereby abnormal states leading to thrombosis and embolism might possibly be detected. As yet the instrument (though developed to measure viscosity of flowing liquids in industry) has not been successfully adapted to measurement of flowing blood, though certain sources of error have been uncovered and corrected by the manufacturers (Bendix Aviation Corporation) and reproducible results in drawn blood samples are now possible. In venous

blood from dogs and humans it has been found that coagulation viscosity patterns may alter during anesthesia, often tending to accelerate coincident with hypoventilation; that coagulation viscosity patterns, while tending to be identical for a given subject, vary slightly from minute to minute and from day to day; and that the velocity of blood coagulation is not altered significantly by the mean liquid viscosity of a given blood specimen. This work has been supported by the Surgical Research Gift.

Dr. Hugh Fitzpatrick continued his studies of circulation during anesthesia and operations, especially on patients with cardiovascular disease. Direct measurements were made from various intravascular sites in the cardiovascular system including right and left heart and great vessels as well as peripheral vessels. Controlled animal experiments confirmed the observation made on patients in the operating room that the rapid intravenous replacement of blood was more effective than the intra-arterial route in restoring cardiac output in acute hypovolemic shock.

Professor David V. Habif has continued his studies to elucidate the cause of lymphedema of the arm following radical mastectomy. Tests of lymphatic function are made in order to determine the decrease in function after operation, radiotherapy, and infection. In association with George Kleinfeld of the fourth-year class, laboratory and clinical studies of the anti-inflammatory properties of trypsin and chymotrypsin were done.

Dr. Edmund N. Goodman, in association with Dr. Henry Colcher of the Department of Medicine, has continued to investigate factors influencing the measurement of electric potential in the stomach. The validity of measuring potential across the stomach wall by placing one electrode in the lumen of the stomach and the other on the volar surface of the arm was tested by comparing such measurements with direct readings obtained at operation when the gastric wall was accessible. It was found that variations in potential were identical as measured by the two methods, though absolute potential differed depending upon the junction potentials at the point of application of the electrodes. Clinical studies are continuing, and statistical analysis of the large amount of data so far collected shows definitive patterns. The effects of chemical and pressure changes in relation to changes in potential are also under study.

Under Professor Harold G. Barker the metabolism unit has continued and expanded its program of investigation of fluid and electrolyte shifts in the early postoperative period. An interest has also been continued in the preoperative medical preparation of patients with portal hypertension and ascites in an effort to promote spontaneous reabsorption of ascites.

Under the general supervision of Professor Frank L. Meleney, research work on bacitracin has continued. Dr. John Coddington of the Department of Biochemistry has carried out countercurrent studies with a view to separating the different components of commercial bacitracin. Differences in the antibacterial spectra, the ultraviolet absorption and two-dimensional paper chro-

matographs have been established. New compounds formed by a combination of oxytetracyclene and tetracyclene with bacitracin or polymyxin have been compared with the parent compounds for differences in anti-bacterial spectra, ultraviolet absorption, and paper chromatographs. Conditions necessary for the chemical interaction rather than a physical mixture of combinations of solutions of these two groups of antibiotics have been worked out. Studies on the efficacy of neobacin in preoperative preparation of the gastrointestinal tract are in progress. Work is nearing completion on a survey of bacterial resistance to antibiotics in surgical infections.

The laboratories of surgical pathology and related surgical laboratories of the Institute of Cancer Research have been very active. Professors Virginia K. Frantz and Raffaele Lattes have again presented a course in surgical pathology to the third-year students and with other members of the surgical staff have conducted the "Introduction to Surgery" course which runs throughout the second year.

Much of the work of the departmental cancer research laboratories has been presented in greater detail in the report of the Institute of Cancer Research and will, therefore, merely be summarized here. Professor Lattes is continuing his studies with Professor Charles A. Ragan, Jr., of the Department of Medicine on the mechanism of cortisone inhibition of wound healing. Under his supervision Dr. Carl R. Feind has continued the study of lymphatic spread of malignant tumors of the head and neck; the similar studies initiated by Dr. John Pickren in relation to carcinoma of the breast have been continued; and Dr. Robert Grinnell has further developed his painstaking studies of routes of spread of cancer of the rectum by initiating a study of anal epithelioma and another on the incidence of distal intramural spread of carcinomas of the rectum and rectosigmoid.

In the histochemistry laboratory, also under the supervision of Professor Lattes, Dr. Gabriel Godman completed, in collaboration with Dr. David P. Bloch, certain microspectrophotometric measurements of DNA and nuclear protein synthesis in tissue-cultured cells, and initiated others. Studies of striated muscle and of nucleic acid and protein synthesis in regenerating spinal ganglion neurones in tissue culture are continuing in collaboration with Professor Margaret R. Murray and her group. The study of mucopolysaccharide production by mesenchymal cells in collaboration with Professor Ragan and Drs. Meyer and Grossfeld continues, as does that of mass tissue cultures of osteoblasts in collaboration with Dr. Charles A. L. Bassett of the Department of Orthopedic Surgery.

Professor Frantz has developed her investigation of thyroid cancer by detailed study of radically removed surgical specimens in relation to histological types and routes of spread. In addition a project in collaboration with members of the Radiology Department has been begun in an effort to determine the possible carcinogenic effects of radiation on the rat thyroid. Radioactive iodine uptake studies are continuing.

Professor Edward Howes in collaboration with Professor John D. McLennan of the Department of Microbiology concluded a four-year study of the enzymes of *Clostridium histolyticum*. This work has provided fundamental insight into the role of collagen and other connective tissues in the body and their reactions to injury and new growth. Special efforts have been directed toward enzyme production in volume and purity to permit a more extensive clinical trial.

Professor Cushman D. Haagensen's extensive mouse colony is necessary in order to carry out the multiple biological tests of material which are required to determine the best source of the milk agent. Five preparations have been tested, all of which produce tumors in high dilution, but it is too early to determine which will be the best source. The electron microscope and biological tests have been used in an attempt to ascertain which milk fractions, separated by differential centrifugation, carry the agent. Spherical particles, thought to represent the agent, are being studied. Immunological studies with rabbit antisera are being conducted by Professor Michael Heidelberger of the Department of Medicine. These suggest that an antigen is present in milk-factor preparations which is not present in factor-free milk of the same strain of mice.

The possibilities of cancer control by employment of combinations of chemical compounds selected on the basis of quantitative biochemical differences between normal and neoplastic cells have been further investigated in a group of related laboratories under the general direction of Professor Habif. Dr. Daniel Shapiro has further refined his study of the effects of the specificity of certain synthesized anti-enzymes. A new riboflavin antagonist has been tested in combination with a previously demonstrated effective triple combination, and enhancement of carcinostatic effect was demonstrated. Preliminary trial with even more complex combinations suggest that total destruction, rather than inhibition of growth, may become possible. Dr. Leroy S. Dietrich has studied related hormone-enzyme relationships and devised new methods for determining enzymatic activity in tissues of low enzymatic concentration. Professor Maurice E. Shils of the School of Public Health has continued to collaborate actively in these studies, more especially those related to determination of quantitative vitamin and enzyme differences between tumor and host tissues.

The laboratory for cell physiology, under the leadership of Professor Murray, has investigated a variety of problems at the cellular level, using methods of tissue culture. Mrs Edith Peterson, in collaboration with Professor J. Lawrence Pool of the Department of Neurological Surgery and Professor Alfred Gellhorn of the Department of Medicine, has been investigating the effects of various compounds on cultures of human glioblastoma. Mrs. Helena Benitez, in collaboration with Professor Erwin Chargaff of the Department of Biochemistry, has shown by means of studies of mitotic coefficient and phase percentages among the dividing cell population of adult rat fibroblasts in vitro,

that a variety of widely different compounds antagonize the effects of colchicine in disrupting mitosis. This observation raises some questions in relation to current concepts of mitotic mechanics. Significant advances in neurophysiological method have been made by Mrs. Peterson and her coworkers. She has standardized the long-term culture of embryonic chick spinal ganglion cells so that they retain in isolation essentially normal structure and function. This has made possible pioneer observations on Nissl-substance formation and myelinization in vitro, on satellite-cell relationships, and on investiture of neurons by fibrous material, as well as the first recordings of resting and action-potentials from single isolated nerve cells. Dr. John Paul of the University of Glasgow is studying the effects of large amounts of insulin on the quantity and distribution of Nissl-substance in these sensory neurons.

The monumental two-volume *Bibliography of Research in Tissue Culture,* compiled by Professor Murray and Miss Gertrude Kopeck, was finally released. Its 1,741 pages include every reference in this widely dispersed field from 1884 to 1950.

Other elections, honors, and awards include the following: in September, 1953, Professor Deterling was elected treasurer of the International Society of Angiology; Professor Howes was reappointed special consultant to the Armed Forces, Department of the Army. Professor Murray was elected president of the Tissue Culture Association and official delegate of the association to the Eighth International Congress, to be held in Leiden in September. Professor Arthur Purdy Stout was elected president of the New York Cancer Society, president of the Halstead Club, honorary president of the Second Reunion of Pathologists of Mexico, honorary member of the Sociedad Mexicana de Estudios Oncológicos, associate member of the Société Anatomique de Paris, and on May 4, 1954, he received the Clement Cleveland Award of the New York City Cancer Committee of the American Cancer Society. Professor George H. Humphreys has been organizing chairman of the section on cardiovascular surgery of the American Heart Association for the past year, and on February 19, 1954, he was elected president of the New York Society for Thoracic Surgery. Professor Jerome P. Webster was elected a vice-president of the New York Academy of Medicine. The William H. Welch Medal "for particular contributions of outstanding scholarly merit in the field of medical history" was awarded by the American Association of the History of Medicine to Mrs. Martha T. Gnudi and Professor Webster for their book, *The Life and Times of Gaspare Tagliacozzi: Surgeon of Bologna 1545–1599,* which was published in 1950.

As Professor Webster approaches retirement, there is increasing concern for adequate housing of the library which he has given to the University. The Webster library on plastic surgery has grown from a small personal collection to what is probably the most complete library on plastic surgery in existence today. It now consists of approximately 16,700 items, comprising about 3,700 books, 8,000 theses and dissertations, and over 5,000 reprints of

articles. Thirty medical journals are kept up-to-date and readily available to staff members and students. The book and periodical section of the library includes recent books, reprints, and journals concerning plastic surgery, as well as volumes dating back as far as the fifteenth and sixteenth centuries. Histories of medicine, biographies, bibliographies, and dictionaries complete the tools by which historical and current research is carried on. The Webster library also complements and increases the resources of the Columbia University Medical Library for the use of all departments of the Medical Center.

DEPARTMENT OF UROLOGY

Professor George F. Cahill, Executive Officer

There has been no appreciable change in the type of teaching in the senior class from the preceding year.

Dr. Alex Finkle has resigned as instructor in urology to accept a full-time position as assistant professor of clinical urology at the University of California. Dr. Stanley Braham has been appointed an assistant in the department.

Professor Harry Seneca has continued his studies upon the synergistic effect of antibiotics on microorganisms. He has shown in vitro tests that bacitracin plus polymyxin, bacitracin plus polymyxin plus viomycin, bacitracin plus polymyxin plus neomycin, and bacitracin plus others have synergistic effect on shigella, salmonella, escherichia and staphylococci. Also that tetracycline plus carbomycin, oxytetracycline plus carbomycin, and tetracycline plus oxytetracycline have synergistic effect upon *Endamoeba histolytica* cultures. He also experimented in the mutation of *E. histolytica.* He grew for fifty-one generations eleven strains which came from various parts of the world and which contained various concentrations of oxytetracycline. One strain became more resistant, two became sensitive, while the remainder were unaffected. When these experimental strains were later grown for twenty generations in normal media in the absence of the antibiotic, the sensitive strains returned to normal, while the resistant strain maintained its acquired resistance. He experimented upon the maintenance of *E. histolytica* in cultures with carbomycin. *E. histolytica* requires subculture every forty-eight hours because bacteria produce certain growth factors without which the amoeba cannot survive. These amoebae can be carried up to eight days by carbomycin so that the previous frequent cultures are no longer necessary. In his studies upon the effect of glucocorticoids on bacteria in the presence of antibiotics, he concluded that DOCA, Compounds S, E, and F, do not possess any bacteriostatic effect upon bacteria, and they neither suppress nor augment the bacteriostatic effect of penicillin or oxytetracycline. He studied a new antibiotic, anisomycin, which apparently was considered to be effective on trypanosomes, leishmania, and trichomonas, and found that it was not effective in experimental trypanosome and leishmania infections. In his further studies of the effect of

antibiotics on spermatogenesis in rats, he found that oxytetracycline and polymyxin stimulate spermatogenesis. Penicillin, bacitracin, streptomycin, and carbomycin, given in therapeutic doses, have no stimulating effect. At present he is investigating the effects of antibiotics on ovarian function and on the maturation of the graffian follicle. He has continued his studies on the mechanism of increased susceptibility to infection caused by the administration of cortisone and hydrocortisone. During the year, attempts have been made to culture *Toxoplasma* and to obtain a pyrogenic factor from *Trypanosoma cruzi.* In conjunction with Professor Abner Wolf of the Department of Pathology, an organism was cultured from rhesus monkeys imported from India which has the same morphology, cultural characteristics, and life cycle of *T. cruzi.* Agglutination and agglutination-absorption tests show that *T. cruzi* and the Indian trypanosome are identical. Triatomid bugs (*Triatoma gerstackeri* and *Rhodnius prolixus*) can be artificially infected with this trypanosome, the trypanosome appearing in the hind gut in two to three weeks. It is thus concluded that the Indian trypanosome is *T. cruzi,* which is the causative agent of American trypanosomiasis. It is very likely that human and animal cases of American trypanosomiasis (Chagas' disease) occur in India. Identification of the transmitting vector, or vectors, in India is of epidemiological importance.

Professor Seneca has also been working with Dr. Eric Ellenbogen of the School of Public Health, University of Pittsburgh, on the effect of tetracycline group upon plasma proteins, especially gamma globulin. With Professor John K. Lattimer, he has been investigating the anti-inflammatory and therapeutic local effect of hydrocortisone in chronic interstitial cystitis. In conjunction with Dr. Archie L. Dean, Jr., he has undertaken a clinical investigation of the effect of hydrocortisone upon prostatic carcinoma.

Professor Lattimer has continued his studies, in conjunction with the Veterans Administration and the United States Army and Navy, upon urinary tuberculosis. They have shown a great reduction in mortality in a series of 625 cases of renal tuberculosis treated with the new antituberculosis drugs. He and Professor Harry M. Rose of the Department of Microbiology supervised Dr. Dean in a study of the relative value of the bacterial culture techniques and the guinea pig in the diagnosis of urinary tuberculosis. In the studies done by Professor Lattimer and Dr. Michael Kenny of the Department of Microbiology of the Kingsbridge Veterans Hospital, they showed that it is impractical to grow *M. tuberculosis* from the urine while the patient is taking antitubercular drugs. With Dr. Timothy Donovan of the resident staff, a study was made of the best method of the technical handling of a tubercular ureteral stump after nephrectomy. The value of results in urine investigations for tuberculosis with acid or alkaline tides is now in study. Uses of hydrocortisone and other such media upon the vesical fibrosis of tuberculosis and interstitial cystitis is being carried out. Professor Lattimer presented a detailed classification of the roentgen lesions of kidney tuber-

culosis so that on an international scale the effectiveness of the various therapies might be compared. He reported upon the transmission of genital tuberculosis by semen. In conjunction with Drs. William H. Sheldon, Sylvia Traube, and Albert Damon of the Department of Medicine, a study of the somatotypes of people in relation to occurrence of renal tuberculosis was continued. Professor Lattimer and Dr. James B. Campbell of the Department of Neurological Surgery are studying the mechanism of flaccid dilatation of the urinary tract in children, a problem often associated with infection. He presented a motion picture on the surgical technique for relief of bladder neck obstruction in children at the meeting of the American Urological Association. He also made a motion picture on a new method of plastic repair of the kidney-ureter junction and another upon the technique of hemostatic solusponge in suprapubic prostatectomy.

During the year, the group under Professor Perry B. Hudson carried on team research in the areas of enzymology, hormonal and steroid chemistry, nucleic acid metabolism, surgical pathology, and clinical techniques.

During the last year, laboratory studies on the prostatic acid phosphatase enzymes have shown that these substances are specific proteins probably foreign to human serum except in those instances in which the prostatic carcinoma has metastasized. A tentative correlation has been achieved between the extreme elevation of serum prostatic acid phosphatase and alteration in hepatic function. The isolation of the prostatic enzyme has been apparently successful. A description of the phenomenon of low-acid phosphatase values in patients with actual metastatic carcinoma has been given. Laboratory studies have demonstrated that the enzyme is denatured mainly by heat and this principle has been employed by lowering the body temperature before estimation of the circulating enzyme. The observation has been confirmed in the metastatic cancer patients suffering from urinary tract infections. The studies in enzyme kinetics have been continued. A neutral phosphatase has been studied—human red cell phosphomonoesterase—and the stabilization and inhibition characteristics have been explored. Theoretical studies have been made in the laboratory on the mechanism of uremia, and artificially induced uremia has been produced in dogs for this purpose. Techniques for the purification of uricase have been developed and possible mechanisms for the potential enzymatic control of uric acid metabolism have been postulated. The investigation into methods and acquisition of factual and theoretical information precede a clinical study of uremic patients which is expected to be initiated soon. The steroid chemical problems investigated have included those relating to the extraction of steroids from human blood—made possible by cannulating the central adrenal vein. The isolation of specific steroid substances has been achieved. The principle of dialysis coupled with continuous extraction has been modified to make this isolation practicable. Recoveries have been made of between 90 and 100 percent of desoxycorticosterone, cortisone, hydrocortisone, androstenedione, and other steroids from

the blood. The mechanism of urinary steroid excretion following hormonal depletion surgery has been studied in connection with bilateral or total adrenalectomy for advanced mammary cancer. A clinical evaluation of the effective dosage levels of the monoammonium salt of glycyrrhizinic acid has been made as part of an appraisal of the drug in adrenalectomized patients.

In the laboratories devoted to the study of nucleic acid metabolism, vascular perfusion and the use of radioactive tracer compounds have been employed in studies on the biosynthesis of nucleic acid in excised human kidney and testis. A consistent pattern of isotope distribution has been found in the nuclear and cytoplasmic pentosenucleic acid of these organs. The metabolic stability of the nucleic acids continues to be studied. Current with the isotope studies, new methods for evaluating the radiochemical purity of tracer compounds have been developed. Techniques for the visualization and identification of compounds have been so modified that nucleotides, nucleosides, and bases from nucleic acid can be identified on paper chromatograms. Improvements in instrumentation have accompanied the work on paper chromatography. The use of nisentil hydrochloride as an analgesic-narcotic in the preparation of patients for minor surgical procedures has been initiated and completed. The use of glycyrrhizin as a maintenance drug in patients following total adrenalectomy has been explored. The oral dosage level of diethylstilbestrol has been studied and the effectiveness of large oral doses in advanced prostatic carcinoma has been demonstrated. The evaluation of surgical techniques for the early detection of unsuspected prostatic carcinoma has been continued. Experience has shown that open perineal biopsy is safer than either needle biopsy or transurethral resection. The mortality following radical surgery has been decreasing each year. The study of unsuspected adenocarcinoma in the aging male population continued during the year with the cooperation of the Department of Welfare of the City of New York. Early cancer has been detected in approximately 13 percent of 400 cases evaluated.

The results of the studies of Professor Hudson and the group working with him have been published in twenty-four separate articles.

Professor Meyer M. Melicow has continued his supervision of instruction in urological pathology to the students and residents. During the year he spoke and presented a paper on primary tumors of the retroperitoneum in which he presented tables of classification. A study was made upon the occurrence of plasmacytoma of the testis and a report of the study was published with Professor George F. Cahill in the *Journal of Urology*. He and his technical staff have in preparation a study on the classification of tumors of the testis.

Professor Cahill has completed his nine-year service as a member and trustee of the American Board of Urology, and after service as president of the American Board of Urology, he has retired as member emeritus. He has also completed his term as trustee of the American Urological Research Foundation, Incorporated. During the year, he participated in a number of

medical society meetings and presented several papers upon adrenal disorders. He has continued his collaboration in the work upon adrenal disorders with Professors Joseph W. Jailer and Marcel Goldenberg of the Department of Medicine.

MEDICAL LIBRARY

Professor Thomas P. Fleming, Medical Librarian

The Medical Library serves as the nerve center of information, not only for the research investigator, but also for those responsible for medical education and patient care. Medical research is no longer the sole province of the medically qualified investigator. Immunochemists, organic chemists, physical chemists, physicists, statisticians, engineers, entomologists, geneticists, and parasitologists have all joined forces with the clinicians and the basic medical scientists in investigating the nature and therapy of the disease process.

There is perhaps no easy way of disseminating information in any field of scientific endeavour, but the problem is unusually difficult in those fields where rapid progress is being made; yet it is precisely here that the need is greatest. The specialist working at the very frontiers of his science must in his own interests keep himself up to date by constant reference to the original literature, but in these days of increasing specialization and of specialist journals, he often finds it difficult to keep abreast of all the developments that might affect his work.

For the past fifteen years, the Medical Library has been the leading center in the United States for the education of medical librarians. Each summer, under the auspices of the School of Library Service, approximately twenty students spend six weeks of intensified work here at the Medical Center. This training is over and above the graduate professional degree in librarianship. Graduates of this course are now operating medical libraries in Argentina, Austria, Britain, Canada, Chile, Cuba, Mexico, and Uruguay, as well as in most of the forty-eight states.

The Medical Library's concern is not only with training librarians to make the most effective use of the literature in providing information for medical scientists; it is equally concerned with teaching the medical scientist and the student of the medical sciences how best to make use of existing literature.

For the past seventeen years, the Faculty of Medicine has developed a policy of providing instruction in the use of the literature. It has not encouraged the inauguration of any formal course on the use of the library. The curriculum is already overcrowded, and the results of a formal course as opposed to our present method has received careful consideration. The Medical Librarian and his professional staff, at the invitation of various departments, present

formal lectures on the use of the literature of a particular field. Orientation tours are given the entering classes. Sections of laboratory manuals are prepared showing the literature tools of various subjects. Talks are given before journal clubs, and informal demonstrations and conferences are held with individuals and groups of scientists.

Adequate space is constantly a problem. Five years ago the South Property Annex was opened up and some thirty thousand volumes of texts and monographs were moved there. More than a thousand of our rarest classics of medicine were transferred to the Department of Special Collections in Butler Library. In these five years, the normal addition of new publications has used up the space acquired as a result of transferring material elsewhere, and the lack of space continues to make efficient operation difficult. The next impending move will have to be more drastic and will place many undesirable obstacles in the way of the reader and further hamper research. We welcome, therefore, the opportunity we have had to again submit plans for a new library.

During the year all of the libraries in Columbia were asked to prepare a statement of their collecting policies. While the report presented to the Director of Libraries was in some detail, a brief statement here would seem to be in order. The Medical Library has the primary responsibility in the University for providing literature to support the activities of twenty-four departments in the Faculty of Pure Science and the Faculty of Medicine. In order to carry out this function, the library attempts to provide comprehensive collections of the literature in certain areas. By comprehensive collection is meant: 1) the current receipt of every primary journal in the field in every language and the majority of the secondary journals in the Roman alphabet, 2) the maintenance of the latest editions of standard texts in English, 3) the current acquisition of every important monograph and extensive treatise in languages using the Roman alphabet. For various reasons, in certain subject areas such as dermatology, orthopedic surgery, otolaryngology, and urology, this goal has not been achieved. Preliminary estimates show that sums varying from $5,000 to $25,000 per subject are required for retrospective literature and sums varying from $600 to $2,500 would be required for the current literature. There are two other subject areas, ophthalmology and psychiatry, in which this library does not have a comprehensive collection. This stems from the fact that the Presbyterian Hospital maintains an extensive library of ophthalmology in the Institute of Ophthalmology and New York State Psychiatric Institute provides one of the finest libraries of psychiatry in the country.

Because of activities in the Medical Center, it is necessary to maintain working collections in certain subject areas, even though the primary responsibility for the maintenance of the literature lies elsewhere—for example, chemistry, mathematics, physics, sociology. A working collection means: 1) the current receipt of the primary journals utilizing the English, German,

and French languages; 2) the maintenance of the latest edition of a selection of standard texts in English; 3) the acquisition of the most important monographs in English. The Medical Center is fortunate in that its library is administratively tied in with all of the Columbia libraries such that the resources of Columbia's more than two million volumes can be made readily accessible through an intralibrary loan system.

Our own collection now numbers nearly 200,000 volumes, and we currently receive approximately 2,300 journals. It is interesting to note that during the year more than 225,000 volumes were either consulted or removed from this library. This represents a 10 percent increase over the previous year.

During the year more than sixty thousand issues of periodicals were received, sorted, checked into the records, and shelved, and in due course were appropriately taken from the shelves, arranged into suitable volumes, sent off to the bindery, received back from the binder, and returned to the shelves. The necessary record keeping and physical exertion needed to accomplish this one housekeeping task require the full-time activities of a number of people, most of whom are never seen by the users of the library.

Professor Fleming conducted a Five-Day Institute on current problems of science literature service. It was attended by 106 representatives from fifty institutions and organizations. These came from fourteen states and three Canadian provinces.

WILLARD C. RAPPLEYE, M.D.
Dean

June 30, 1954

COLUMBIA UNIVERSITY
BULLETIN OF INFORMATION

Fifty-fifth Series, No. 45 November 12, 1955

Report of the Dean of the Faculty of Medicine

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1955

COLUMBIA-PRESBYTERIAN MEDICAL CENTER
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The series includes the report of the President to the Trustees and the announcements of the several colleges and schools relating to the work of the next year. These are made as accurate as possible, but the right is reserved to make changes in detail as circumstances require. The current number of any of these announcements will be sent upon written application to the Office of University Admissions, 322 University Hall, Columbia University, New York 27, N.Y. Copies may be obtained in person from the Office of the Secretary, 213 Low Memorial Library.

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FACULTY OF MEDICINE

REPORT OF THE DEAN

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1955

The registration of the School of Medicine was as follows:

First year	120
Second year	115
Third year	118
Fourth year	113
TOTAL	466

Residents from forty-five states and twenty-six foreign countries, totaling 1,549 students from 235 colleges, applied for admission to the first-year class entering in September, 1955. The 120 accepted students received their liberal arts education in forty different colleges and came from twenty-two states and one foreign country.

The registration of the School of Dental and Oral Surgery was as follows:

First year	42
Second year	41
Third year	32
Fourth year	35
TOTAL	150

During the year there were sixty-four students registered for non-credit postgraduate courses in the Dental School and forty-three students registered for postgraduate credit courses. A class of thirty students was enrolled in the Courses for Dental Hygienists and eleven received the Bachelor of Science degree.

In the School of Public Health the registration was as follows:

D.P.H. candidates	1
M.P.H. candidates	30
M.S. candidates	39
TOTAL	70

The registration in the Department of Nursing was as follows:

First year	120
Second year	108
Third year	113
TOTAL	341

During the past year there were 641 students from sixteen affiliated schools of nursing who received instruction under the Department of Nursing in various hospital and laboratory units of the Medical Center.

In the Course for Occupational Therapists forty-eight students were registered, and in the Course for Physical Therapists, forty-eight students.

The following degrees were awarded during the year:

M.D.	113
Med.Sc.D.	2
D.D.S.	35
D.P.H.	1
M.P.H.	30
M.S. (Public Health fields)	39
B.S. (Nursing, Occupational Therapy, Physical Therapy, Dental Hygiene)	102

In addition to the students enrolled under the Faculty of Medicine there were ninety-one students registered under the Graduate Faculties of the University who took courses and advanced research work in the departments of the Medical School.

The preceding figures indicate that the Faculty of Medicine is responsible for the instruction of many more students, graduate and undergraduate, than is commonly known. The total of medical, graduate, postgraduate, nursing, occupational therapy, physical therapy, dental, dental hygiene and public health students, visiting scholars, fellows, hospital residents, and younger staff members runs to over three thousand full-time and part-time students.

It is gratifying to report that during the academic year eighty of the medical students received scholarships averaging about $437 per student.

Mention was made in last year's report of the publication of the book *Preparation for Medical Education in the Liberal Arts College,*

a study made by a committee, of which Associate Dean Severinghaus was chairman, in cooperation with 115 liberal arts colleges. The widespread interest in this report has been partly responsible for the many requests which have come this year from liberal arts colleges for Dr. Severinghaus to speak on preprofessional education. He spoke at the national convention of Alpha Epsilon Delta at the University of Indiana, at which time he received the organization's First Distinguished Service Award for his contribution to liberal education. He also spoke at the state conventions of higher education in Michigan, North Dakota, and Georgia and at special meetings at Hamilton and Haverford Colleges, Colgate, Ohio Wesleyan, West Virginia, Syracuse, Wesleyan, and Howard Universities. He delivered the Samuel Harvey Memorial Lecture in French Lick Springs, the Albert Swift Memorial Lecture at Syracuse, and the Alpha Omega Alpha inaugural address at Howard, as well as the commencement addresses at Georgia Medical College and Bard College. He was honored by the degree of Doctor of Science from Bethany College in West Virginia and by the Doctor of Laws degree from Bard College.

It is with the greatest sorrow that we report the following deaths during the year:

Robert R. Chace, Instructor in Ophthalmology, on November 25, 1954

Charles Costello, Clerk, Front Desk, Retired, on February 5, 1955

Adolph Elwyn, Associate Professor of Neuroanatomy, on June 9, 1955

Evan M. Evans, Professor Emeritus of Clinical Medicine, on March 17, 1955

John G. Hawley, Assistant in Medicine, on February 22, 1955

George M. MacKee, Professor Emeritus of Clinical Dermatology and Syphilology, on May 8, 1955

Edgar G. Miller, Professor of Biochemistry and Dean of the Graduate Faculties, on June 28, 1955

Alwin M. Pappenheimer, Professor Emeritus of Pathology, on February 21, 1955

John S. Parke, Associate Professor of Hospital Administration and Executive Vice-President, Presbyterian Hospital, on August 13, 1954

Herbert B. Wilcox, Professor Emeritus of Pediatrics, on February 1, 1955

Adolf Zeckel, Associate in Psychiatry, on March 17, 1955

The following retirements are reported, each of whom received emeritus designations by the Trustees:

J. Burns Amberson, Professor of Medicine, effective June 30, 1955
George F. Cahill, Professor of Urology and Executive Officer of the Department of Urology, effective June 30, 1955
Houghton Holliday, Professor of Dentistry, effective September 30, 1954
Maurice Lenz, Professor of Clinical Radiology, effective June 30, 1955
Frank L. Meleney, Professor of Clinical Surgery, effective June 30, 1955
Harry S. Mustard, Professor of Public Health Practice, effective June 30, 1955

In the retirement of Dr. George F. Cahill we record the appreciation of the entire staff and generations of students who have benefited by his skill and teaching ability. He has brought great distinction to the School through his outstanding contributions in his specialty. It is gratifying to know that he will continue to be available for advice and active clinical work.

The retirement of Dr. J. Burns Amberson calls attention to the noteworthy services he has rendered the University through his many years as professor of medicine and in charge of the Chest Service at Bellevue Hospital. The research and teaching programs in tuberculosis and other diseases of the chest have attracted world-wide attention.

The following new appointments were made:

Clement C. Clay, Associate Professor of Administrative Medicine, from November 1, 1954
Tiffany Lawyer, Associate Professor of Clinical Neurology (Montefiore Hospital), from September 1, 1954
Fred V. Lucas, Associate Professor of Pathology, from July 1, 1955
John H. McClement, Associate Professor of Medicine, from July 1, 1955
Ray E. Trussell, DeLamar Professor of Administrative Medicine, Executive Officer of the School of Public Health and Administrative Medicine, and Associate Dean (Public Health), from July 1, 1955

The following promotions were made during the year:

Juan M. Taveras, Associate Professor of Radiology, from October 1, 1954
Josephine S. Wells, Associate Professor of Radiology, from October 1, 1954
Russell Wigh, Associate Professor of Radiology, from October 1, 1954

Effective July 1, 1955, the following promotions were made:

Frederic J. Agate, Associate Professor of Anatomy

Margaret Bevans, Associate Professor of Pathology
George V. Browne, Associate Professor of Clinical Otolaryngology
Sidney Carter, Associate Professor of Clinical Neurology
Robert H. E. Elliott, Associate Professor of Clinical Surgery
Ruth J. Guttmann, Associate Professor of Radiology
Paul H. Hoch, Associate Professor of Clinical Psychiatry
William A. Horwitz, Associate Professor of Clinical Psychiatry
Julia M. Jones, Associate Professor of Medicine
Franz J. Kallmann, Professor of Psychiatry (Genetics)
Forrest E. Kendall, Professor of Biochemistry
John K. Lattimer, Professor of Urology and Executive Officer of the Department of Urology
Irville H. MacKinnon, Professor of Psychiatry
Lester A. Mount, Associate Professor of Clinical Neurological Surgery
David Nachmansohn, Professor of Biochemistry
Phillip Polatin, Associate Professor of Clinical Psychiatry
Milton R. Porter, Associate Professor of Clinical Surgery
Conrad M. Riley, Associate Professor of Pediatrics
Lawrence W. Sloan, Professor of Clinical Surgery
George K. Smelser, Professor of Anatomy
Ludwig von Sallmann, Professor of Ophthalmology
Jules Waltner, Associate Professor of Clinical Otolaryngology

The Janeway Prize, awarded to the graduate who, in the opinion of the faculty, has ranked highest in efficiency and ability, was given to Bard Cosman. The Borden Undergraduate Research Award was given to Richard L. Naeye for outstanding research work during the medical course. The Joseph Mather Smith Prize, awarded to the graduate whose essay or original research in medical subjects is deemed by the Committee on Award to be the most meritorious, was given to Dr. Helen M. Ranney, Class of 1947. The Dr. William Perry Watson Prize in pediatrics was awarded to Arthur S. Verdesca. The VanWoert Scholarship Prize was given to Sidney Prager. The Operative Division Prize, the Alpha Omega Fraternity Award, and the Psi Omega Fraternity Award were received by Sidney L. Gordon. The Ella Marie Ewell Certificate and Medal in dentistry were given to George A. Yamanaka. The Rowe-Wiberg Medal was given to Arthur D. Misicka. Charlotte Lafer was given the Frederick Parker Gay Memorial Award. Harold Lee Meierhof Memorial Prize was awarded to Richard L. Naeye. The Joseph Garrison Parker Award was given to Robert F. Stuckey. The Certificate for Ex-

cellence in Pedodontics, awarded by the Class of 1929, was given to Arnold D. Rosen.

SCHOOL OF PUBLIC HEALTH AND ADMINISTRATIVE MEDICINE

It is gratifying to report that the Trustees of the University during the year have changed the name of the School of Public Health to the "School of Public Health and Administrative Medicine" beginning July 1, 1955. This is in recognition of the newer concepts of public health which are becoming increasingly concerned with the administration of hospitals, medical care plans, prepayment insurance, industrial and labor relations in regard to health matters, and a wide variety of social and economic problems related to the health of the population.

We are greatly pleased to report that Dr. Ray E. Trussell, director of the Hunterdon Medical Center, Flemington, New Jersey, has been appointed DeLamar Professor of Administrative Medicine, executive officer of the School of Public Health and Administrative Medicine and will also serve as associate dean of the Faculty of Medicine for public health. Dr. Trussell brings exceptional experience and achievement in the field of administrative medicine.

Dr. Harold W. Brown resigned from the directorship of the School of Public Health as of June 30, 1955, to return full-time to his duties as professor of parasitology. Dr. Brown deserves great credit for the new emphasis in our program of public health. During his period as director of the School of Public Health he rendered invaluable service to students, hospitals, and the entire staff. Fortunately for everyone, he will continue his teaching and research in parasitology, in which he is an outstanding authority, and will be immediately available for his wise counsel and advice in developing the plans for administrative medicine.

THE GRADUATE AND POSTGRADUATE PROGRAM

The graduate and postgraduate program, under the supervision of Associate Dean James E. McCormack, had an enrollment of 508 physicians in fifty-seven courses. There is a steady demand for such training and we are endeavoring to keep our program strong by eliminating courses for which there is decreasing need and introducing new ones as indicated. Several new courses related to radiation physics and the use of radioactive isotopes have been introduced. Thirty residents in affili-

ated hospitals registered in special basic science courses. Many residents and fellows in affiliated hospitals also participated in educational and research activities at the School.

In addition to the usual large number of physicians and educators from various parts of the world who visited the Medical School and the Medical Center for brief periods and informally, there were eighty-eight visitors from thirty-five countries who came for extended periods of study during the past year.

STUDENT HEALTH SERVICE

The Student Health Service, under the faithful direction of Dr. Albert R. Lamb, Jr., continues to meet the health needs of the students and employees of the Faculty of Medicine.

During the past year there were 399 routine physical examinations on students and 316 pre-employment physical examinations on new employees. Nineteen students were admitted to the admitting ward and forty-seven to the hospital. Routine chest X rays and routine dental examinations, including X rays, are available to the student body.

Besides providing routine health service, the Student Health Service continues to help students in other ways, such as rendering premarital examinations, completing insurance forms, and offering other similar services.

SUPPLY OF PHYSICIANS

Inasmuch as the keystone in the arch of health services for the nation is the physician, the question of a sufficient supply of doctors is of primary consideration. The 165 million people of the United States are dependent upon an active medical profession of 225,000 physicians, a ratio of one to about 750 people. This ratio is approximately sufficient in total if all of the doctors were adequately trained, better distributed, and more effectively utilized in relation to actual needs. One of the major problems is the proper location of our present supply of physicians, excessive numbers of whom are now concentrated in the large urban areas.

It is of importance to note that during the last forty-five years the number of medical graduates has risen 117 percent, while the population grew 76 percent. The output of the medical schools at the present time is increasing more rapidly than the population, which is gratifying. The

total numbers are only a part of the picture, however, because the quality and competence of doctors are far more important aspects of proper medical care than mere numbers.

MEDICAL RESEARCH AND EDUCATION IN RELATION TO INDUSTRY

The philosophy of American industry has been undergoing noticeable changes during the last several decades. The objectives of competitive business enterprise have broadened as appreciation of community and national responsibilities has grown. During the same period medical and health services have widened to embrace preventive medicine and a variety of community and family health services. These activities in the aggregate now comprise one of the half-dozen largest employers of personnel in the United States. They represent an annual cost of well over ten billion dollars, not an insignificant item in the total of national expenditures. Medicine broadly conceived is in fact a major industry.

The relationships between medicine and business are apparent in the medical, dental, and nursing care rendered by physicians and others in manufacturing and similar plants. Management has long recognized that the prompt and effective treatment of accidents and illness shortens the disability and absenteeism of employees. Good health is good business. Nevertheless, sickness still causes more idleness than unemployment.

The obvious range and variety of relationships of medical services to industrial operation are, however, only a part, although a very important part, of the health problems of employees. Since the success and profits of industry, and its contributions to national welfare in general, are an essential feature of our economy and depend in such large measure upon the physical and mental vigor of the more than sixty million gainfully employed individuals in the country, the health of this great body of the population is a direct concern of everyone.

Industry is accepting the responsibility of corporate citizenship because it is a social agency as well as a producer of goods. The leaders of business realize fully the obligations which they bear toward the community in which they live and their vital role in maintaining our democratic society. They take a direct interest in the maintenance of the health of the entire community because upon the living conditions and vitality of the local community lies the fate of the private enterprise system.

Not only is management interested in, and taking leadership in, providing better medical care for the local population but there has also been an awakening of concern and the extensive development of programs of health services on the part of labor unions as well. Again, the motivation is one of improving and safeguarding the daily lives of employees and their families. This purpose is emphasized in the numerous fringe benefits being urged or obtained through recent labor union contracts.

There seems to be plenty of evidence that the American people are convinced of the value of adequate medical care. They are determined that the results of modern scientific knowledge be made available to the entire population. This is an indication of the fact that medical security in some form is coming, just as social security has been established, at least partially. The rapid evolution of this concept in the United States has placed an obligation upon the medical schools and universities of the country to produce the necessary personnel to make possible the maintenance and improvement of health services for every economic and geographic group in the country.

In the eagerness and pressure to provide quickly for the entire population, sight is often lost of the fact that the level of any program cannot rise above the competence of those who participate in it. Hence, the recruitment and proper education of professional personnel are essential in this great national undertaking. With the rapid development of scientific knowledge the gap between what is known and what is applied is still great. Overcoming that lag between what is known and what is available to individual patients or their families is the joint responsibility of every employer of labor, of every union, of every community, and of the several health professions.

It is apparent that medicine is dependent in a large measure upon industry and industry upon medicine. Both are concerned with the recruitment and sustained supply of sufficient numbers of qualified physicians, nurses, public health officers, dentists, and others in a body of health workers, the total of which now numbers about two million persons. The proper education and satisfactory conditions of employment of all these groups in universities, hospitals, industrial concerns, and private practice are an essential responsibility of the nation as a whole. It is our American way of life to meet this challenge on a voluntary basis. Corporation

leaders, members of the professions, and those in public affairs and education are dedicated to that method of dealing with the situation.

THE CLINICAL TEACHING STAFF

The impact of current economic conditions upon medical schools is evidenced by the number of unfilled positions in teaching staffs, the increasing trend by those now employed to obtain outside jobs, and the drift away from academic medicine toward private practice. These and other factors explain the noticeable trend toward a modernized version of the proprietary medical school—a trend which is recognizable in every section of the country. These are cogent considerations in recruiting or holding teachers and investigators in the clinical departments and in the basic sciences.

The education of doctors has been the tradition of medicine from earliest recorded history. Medicine was recognized as one of the original faculties of the ancient as well as the medieval universities. However, that recognition was confined chiefly to the medical sciences. Clinical teaching was left largely to the profession itself through various professional bodies and qualifying boards. The control of licensure to practice was until comparatively recently in the hands of the profession.

Medical training for centuries was largely by apprenticeship and preceptorship. As knowledge grew, it was necessary to organize the clinical instruction and faculties, some with nominal relation to existing universities and others without any such relation. In this country about 446 medical schools have been chartered. Many of these were developed quite as much for the benefit of the "faculty" as for the students. Teaching in these institutions was mostly by didactic demonstrations and lectures. All fees were collected and retained by the staff.

Just before 1900 in this country the situation began to change drastically. The Association of American Medical Colleges was organized in 1891. Harvard University increased the length of its medical course to four years in 1892. The Johns Hopkins Medical School was opened in 1893. In 1899 the graded curriculum was adopted. The American Medical Association collected and published statistics on the medical school situation in 1900. It created the Council on Medical Education in 1904 and the following year this council began a series of annual conferences and the classificaton of medical schools, which was aimed essentially at

elevating the standards of medical education and the elimination of the commercial proprietary medical schools. In 1907 the Council of the American Medical Association published its first classification of the schools and in 1910 the report of the Carnegie Foundation for the Advancement of Teaching (the Flexner Report) was published.

The foregoing activities, the increased interest of universities in medical education and, later, the large financial contributions to university medical schools formed the background for the development of university clinical medicine in this country. A number of universities had had good training programs in the clinical divisions but, except in a few instances, practically all of the instruction was provided by practitioners who made their living from private practice.

The widening fields and complexities of medicine required a better education of doctors, the training of clinical teachers, the conduct of clinical research, and the direction and education of younger members of the staffs of both the medical schools and the teaching hospitals. The growth of teaching services on the wards of the university-affiliated hospitals emphasized the necessity of creating and supporting university departments of clinical medicine and surgery.

Two general plans developed. The first was a gradual increase in the teaching, research, and hospital responsibilities of the clinical teachers, which was reflected in the expansion of medical school and hospital facilities, better compensation, the employment of full-time assistants, technicians, secretaries, and other elements that go into the creation of a medical school department. In the beginning, the doctor usually kept his own office and retained his own private fees. Later, as duties increased and individuals developed their own interests in teaching and research, it was natural that their work be concentrated at the medical school and teaching hospital. Here they were granted the privilege of seeing patients and retaining the professional fees.

The second plan was a more complete break from practice—the setting up of purely university departments of medicine and surgery. The original plans of the strong advocates of this program called for a strictly full-time basis of employment on a salary. The professor was not expected to see private patients. Later, when that plan did not work out satisfactorily, he was permitted to see private patients but not allowed to charge fees. This program also did not last long—the universities found

it difficult to provide the salaries of the senior members of the staff and their assistants, and the necessary laboratory and other expenses. Nevertheless the plan served a useful purpose in that it indicated the importance of having the teaching concentrated in clinical departments of universities rather than conducted by practitioners who could only give secondary consideration to problems of research and instruction.

The development of one form or another of university full-time medical teaching explains in considerable degree the great progress of American medicine during the last forty years. The plan of university medicine has been widely adopted and could be expanded a great deal further if more money could be found for its support. The present inflation calls for numerous modifications to provide increases in the compensation of clinicians and other members of the staff—increases which the universities under current economic conditions cannot provide from their own funds. Many such modifications of the full-time system have taken place in the last few years.

The combination of strictly full-time, geographic full-time, and part-time in a single institution presents some difficulties in balancing the responsibilities, opportunites, and financial return to members of the staff. The mere co-existence of a large group of men in private practice who enjoy relatively large incomes and hospital as well as University privileges and a smaller group of men who are trying to develop into medical investigators and teachers offers a local problem which is reflected in part in the influence and motivation of students as well as the younger members of the organization. There is a strong tendency in such institutions for the center of gravity and primary interest to shift toward private practice.

The development of full-time research and teaching opportunities in the clinical departments of the medical schools of this country has contributed greatly to the rapid advance of medical teaching and research during the last several decades by drawing increasing numbers of well-trained young medical men and women into academic careers in the clinical departments of universities. The effect has been to attract into clinical departments to an appreciable extent the normal flow of young, well-trained medical men who in earlier periods went into the basic sciences, with consequent reduction at present of a supply of teachers and investigators in the basic sciences who have had a medical training. A

balance between clinical medicine and the medical sciences can be maintained only if the incentives and attractions of the medical sciences compare reasonably favorably with corresponding opportunities in the clinical full-time fields. At the present time, the instructional staffs of the medical sciences throughout the country are being largely recruited from nonmedical personnel.

Columbia University has explored all plans from practitioner teaching, including outside tutoring classes, to the strictly full-time basis without any outside private practice. The present program is a combination of all, arrived at by evolution and adapted to the conditions in New York City and at the Columbia-Presbyterian Medical Center. The aim is to have a small nucleus of strictly full-time persons as the executive officers of most of the major clinical departments, a group of major, full-time assistants in various stages of advanced training for academic careers, and a large number of geographic and part-time teachers.

FINANCIAL SUPPORT OF MEDICAL EDUCATION

If the concept is correct that industry, the community, and the universities have joint responsibility for the maintenance of a proper supply of competent physicians in the public interest, then there is placed upon industry as well as the community an obligation to help finance the medical schools as well as qualified individuals who desire to enter and be educated for the professional fields. That obligation can only be met through joint efforts of leaders in medicine, the universities, industry, and public affairs.

The education of personnel for the health services is a national obligation devolving largely upon the eighty medical schools of the country and their affiliated hospitals and universities. Because of their very importance, medical education and research will be supported in one way or another. Since they are essential to the proper functioning of industry in a modern society it seems only logical that business should help substantially. The alternatives might include government support with some degree of control and direction or the further growth of proprietary and hospital medical schools—a trend now in full evidence. There are certain disadvantages to the public interest in either of these methods.

The realization of the situation is growing. Individual industries have themselves undertaken to help universities in their financial difficulties in

various ways, some through direct support of specific research projects related usually to their own interests or through scholarship grants as part of their own recruitment plans. Although these efforts have been highly encouraging, the amount of assistance as yet is only a small part of the funds necessary to meet the problems.

Corporate contributions to all private educational institutions last year represented eight cents of each dollar of expenditures of those universities and colleges. The $100 million given, while large, is only a minute fraction of the total national product of goods and services. Last year it was only one fourth of one percent of net corporate profits before taxes, a small investment indeed in a function essential to American society and to American industry as well. One fortieth of one percent of those net profits would underwrite the present deficits of the medical schools of the country.

SUPPLY OF STUDENTS

During recent years the applications for admission to medical schools have been declining, due in large part to the many opportunities offered to recent college graduates in industry, government service, and various other activities which make it possible for a student to become economically independent at a much earlier age than if he were to pursue a a professional education. It happens that the present expanding economy of the country is demanding many more young men and women who are in their early twenties. This group is being drawn from a largely reduced population pool—reduced because of the low birth rate in the depression years.

The prediction at the moment is that the student enrollments in the years ahead will be markedly accelerated. For example, the total of pupils in high school in 1950 was 6.6 million, but by 1965 it will be 12.5 million. The college population of approximately 2.5 million students at the present time will be close to double that number in ten years. In 1930 only 12 percent of the students of college age were actually in college. This rose to 18 percent in 1940 and now is about 30 percent. There are those who question many of the objectives of mass education; they fear that education for all is in fact education for none.

As for recruitment of professional personnel, many of the large industries, even some related to the health programs, have themselves in-

troduced problems for the universities and others interested in securing an adequate supply of scientists, investigators, and medical, dental, public health, and other students. If this trend continues, in combination with other nation-wide developments which have a similar effect, it will eventually curtail the supply of physicians, research workers, and teachers for the universities and eventually for the needs of the country. This in the long run would be most unfortunate.

The situation has been recognized in recent years but as yet no substantial solution has been found to insure the maintenance of an adequate supply for the sciences and clinical departments or to insure the recruitment of sufficient numbers of highly qualified individuals for the health services. The public campaigns by leading commercial enterprises to employ recent college graduates trained in such subjects as chemistry, physics, electronics, mathematics, and biology, are having a definite effect upon the decisions of young men and women to go or not to go into the professional fields.

The competition is further emphasized in the recent announcement by the federal government to undertake "the most ambitious program that the government has undertaken since World War II" and "to give private interests a run for their money in the employment battle carried on at universities and colleges across the country."

The inducements offered by both industry and government are a real factor in the reduction of superior students who now apply for admission to the medical schools of the country. The total number of applicants is still sufficient to fill the classes of most medical schools that are not limited by geographical regulations, but there is a nation-wide need for a greater number of better-qualified candidates.

If a sufficient number of competent physicians are to be educated to meet the health needs of the future, it will be necessary to provide funds from some or several sources to make it possible for well-qualified students without financial resources to pursue a professional education and career. It is difficult to imagine a more important area of our national life to strengthen than assistance to deserving students who wish to devote their lives to medical science and practice but who do not have the means to pursue their calling. Efforts must be made by educational institutions and others interested in this problem to recruit such men and women in competition with other more immediately attractive and far less de-

manding opportunities. Such a plan of recruitment, however, would pay a large return in future contributions to the country.

CHANGES IN MEDICINE AND MEDICAL EDUCATION

Medicine and medical education are in one of their periodic stages of transition. There have been many such important phases in their long existence. They meet one of the few universal, world-wide needs of mankind, to the service of which they have been dedicated since earliest time.

Never in the long history of medicine have there been more areas for advancement in relation to health than there will be in the days immediately ahead. Knowledge regarding the diagnosis, treatment, and prevention of disease and disability has increased more in the last fifty years than in the previous five thousand. Yet the past is only a prologue to the great discoveries and wider application of advances promised for the future.

Current and future development of scientific medicine will require that physicians remain students throughout their entire lives if they are to meet the obligations to patients and the communities they will serve. Fortunately, most students start well grounded in basic knowledge of medicine and health and in the understanding of the principles, purposes, and ideals of the profession.

Of great importance also is the acquisition of habits and methods of study which will permit them to keep abreast of new information, new techniques, and new contributions from all sources that add to human welfare. This acquisition is assured because the training has emphasized learning by the students more than teaching by the faculty. The preparation in medical school, and it is only that, has given them the tools necessary to insure the resourcefulness, skill, and competence that are required of truly successful physicians. "The wonders and mysteries of life never grow less with increasing knowledge, but rather more, for nature is infinite" and true education is always self-education.

Yet the scientific aspects of the preparation, important as they are, have been only a part of the equipment necessary to meet the demands and responsibilities of a broader character now devolving upon the medical profession. The maintenance and improvement of the physical and mental vigor of the people are among the primary functions of any nation.

The desire of the American public to obtain medical and hospital care is well illustrated by the fact that more than 103 million persons in the country have some degree of voluntary prepayment hospital and medical care insurance, partly through the growth of fringe benefits attached to labor union contracts. The number has increased nearly eighty million in the last ten years. This phenomenon is already having a profound impact upon hospital and medical practice and will influence both in the years ahead. It presents a great challenge to the profession, which the oncoming generation must meet through wise, courageous leadership because ultimately there will be regulation of benefits and premiums. The solution will require ingenuity and imagination if the high level of health care now provided for large, though not all, elements of the population is to be preserved. At the same time it is important to avoid the level of mediocrity which might follow any scheme of regimentation.

The complexity of present-day living in a modern industrial society has had its severe impact on the earlier simple relationship between physician and patient. Nevertheless, the needs in matters of sickness and disability are still individual and personal.

It is a challenge to the professions, institutions, industries, and government to coordinate their efforts in formulating ways and means by which sound, progressive programs can be provided. It would be more than unwise to ignore the broad obligations of medicine, which must be recognized as a social as well as a biological science. It is imperative today that medical instruction recognize and deal with the social, economic, emotional, and other environmental elements in illness, health, and incapacity because the concern of the present-day physician must be with society as well as with medicine, with human beings in their environment and with their multitude of anxieties and emotions as well as with their pathology. These considerations need not and should not substitute for a thorough education in the basic disciplines, but rather should supplement and vitalize it. Scientific knowledge is founded on these disciplines and the future of medical progress, medical care, and public service depends upon them.

Without in any way minimizing the essential role of science in medicine, good medical practice focuses upon the patient, not just upon his disease. The disease may well be only an episode, albeit often important and urgent, in his life. In the long run there is no way for medical prac-

tice or education to function in a vacuum or to withdraw from the realities of life. Medicine from its birth has been dedicated to mankind. It can never be an end in itself but always an instrument of public service.

Medical education serves not only in the development of skills and knowledge, but far more importantly it permits the maturation of the individual student. The search for information, however rewarding, must always be accompanied by the quest for values. It is the latter alone that can bring satisfaction and true happiness in professional life. It is out of attitudes, sound motivation, and value judgments—moral, social, religious—that a physician finally achieves maturity and wisdom—the ultimate goal, if not the destiny, of every man.

A NEW CHALLENGE TO MEDICAL EDUCATION

Recent efforts of the medical profession, partly through legislation, to regulate the methods of compensating teachers in medical schools and university hospitals present a real challenge to medical education.

The production of competent physicians by the teaching institutions will depend not only upon adequate facilites, sufficient financial support, and the recruitment of well-prepared students but also upon a staff of qualified scientists and clinicians dedicated to the education of physicians.

Prepayment plans for hospital and medical services, which have shown a phenomenal growth in the last ten years, are having a pronounced impact upon the financing of those services and indirectly upon medical education.

Adaptations of medical and hospital services to the changing economic, social, and professional conditions are to be expected. They have created apprehension and fear on the part of those who are obliged to meet new situations. These are evolutionary adjustments identified with progress.

In view of the heavy duties upon the staffs, particularly in the clinical departments, many medical schools have put the appointments in those departments on one or another type of full-time employment in order to insure proper instruction of students, the conduct of research, and the supervision of hospital services. These developments have increased the effectiveness of instruction, the productivity in research, and the quality of patient care in the university hospitals.

The teaching institutions which have the function of preparing the future generations of physicians should be encouraged to employ full-

time teachers and investigators under any reasonable plan satisfactory to the staff members and the school that will strengthen and improve the quality of medical education. They should have the support of the profession and hospital associations in their endeavors to maintain the quality of teaching which, in turn, will insure a high level of health services for the future of the country. They should be free from hampering regulations of the medical profession or restrictive legislation which might interfere with their essential functions in a modern society.

DEPARTMENT OF ANATOMY

Professor Samuel R. Detwiler, Executive Officer

The department reports with appreciation the following promotions: Dr. George K. Smelser from associate professor to full professor; Dr. Frederic J. Agate, Jr., from assistant professor to associate professor; Dr. Emanuel B. Kaplan from assistant professor to associate clinical professor; Dr. Malcolm B. Carpenter from instructor to assistant professor; Dr. Christian A. Hovde from instructor to assistant professor; and Dr. Melvin L. Moss from instructor to assistant professor. Sabbatical leaves have been granted to Professor Fred A. Mettler (Neurology), and to Professor Adolph Elwyn. Professor Elwyn will be in his terminal year as associate professor of neuroanatomy. The course in neuroanatomy to medical students will be conducted by Professors Charles R. Noback and Carpenter with the aid of staff members of the Departments of Neurology and Neurological Surgery.

Dr. W. Gregory Cooper, instructor in anatomy, has resigned to accept a position at the University of Colorado.

The elective course in special senses, which has been given to second-year medical students and residents by Professor Samuel R. Detwiler and his assistants for twenty-three years, has been temporarily discontinued as a formal course. Opportunity for informed instruction to residents in ophthalmology and otolaryngology will be made available.

Throughout the academic year, 117 residents from the affiliated hospitals have registered for various courses in the department. The course in clinical anatomy to residents in orthopedic surgery under the direction of Professor Emanuel B. Kaplan continues on its high academic level. Various members of the department have given freely and generously of their time to contribute to the success of this course. Professor Kaplan has offered a special advanced course on hand surgery for residents in this speciality.

Professor Wilfred M. Copenhaver has continued his studies on the histochemistry of cardiac muscle with particular reference to changes at successive stages of development. He has completed studies which show that *Ambly-*

stoma larvae reared in propylthiouracil for a long period of time develop thyroid tumors on the gills and cartilage tumors on the limbs. In a continuation of the problem, hypophysectomized animals are being reared in propylthiouracil to determine to what extent the tumor formation is related to the pituitary gland. Professor Copenhaver has completed a three-year term of service on the Anatomy Test Committee of the National Board of Medical Examiners.

Professor Smelser has continued his research along four lines of investigation, namely, studies on exophthalmus; comparative studies of aerial and aquatic corneas; chemical embryology of the eye; and healing of corneal wounds. In addition, studies are being carried out on the effect of various steroid hormones on experimentally produced exophthalmus. The fat-mobilizing ability of various anterior pituitary hormones and adrenal steroids has been studied.

The results of comparative studies on aerial and aquatic corneas were reported before the Seventeenth International Congress of Ophthalmology held in New York in September, 1954. Evidence has been found to suggest that the difference in the hydropyllia of the two types of corneas is due to a quantitative difference in the salt linkages which bind the collagen fibrils together.

Professor Herbert Elftman has extended his cytochemical research on phospholipids to an investigation of the pituitary gland. The improvements in cytological methods which made this discovery possible have also provided more accurate techniques for evaluating cytological changes in the secretory components of the gland. This project is supported by a grant from the National Science Foundation. Professor Elftman has also continued to serve as a member of the Technical Committee on Prosthetics of the research program on artificial limbs sponsored by the National Research Council. He contributed two chapters to the book *Human Limbs and Their Substitutes,* which summarizes the results of this research program and which appeared during the year.

Professor Edmund Applebaum has continued to collaborate with Professor Carl R. Oman of the Department of Dental and Oral Surgery. More cavities have been cut in the teeth of monkeys by means of an ultrasonic drill. These teeth are being prepared for histological study of the effects of ultrasonic drilling on the dental pulp. With Professor Barnet M. Levy, Professor Applebaum has also assisted in a new teaching program for graduate dentists.

Professor Noback has continued his analysis of Wallerian degeneration in the central and peripheral nervous system. These studies on degenerating myelin correlate some cytological observations with histochemical and chemical data. A qualitative allometric study of the growth of the human brain and the bones of the human skeleton is being concluded. This work has been done in collaboration with Dr. Moss.

Professor Agate is continuing his studies on the endocrine changes accompanying the nephrotic syndrome in the hamster. Together with Mr. F. Kingsbury Curtis, studies are being continued on the role of the hypophysis and other endocrine glands in heat production and particularly in maintenance of the organism's body temperature during exposure to low environmental temperatures. Together with Dr. Landrum B. Shettles of the Department of Obstetrics and Gynecology, an investigation of methods for the measurement of relative uterine blood flow in patients under varying situations has been initiated.

Professor Margaret R. Murray's laboratory of cell physiology has been unusually active during the past academic year. One of the most significant contributions pertains to the action of the vaso-constrictor serotonin upon the pulsating function of oligodendroglial cells in vitro. The results suggest a possible mechanism by which serotonin and certain of its antagonists may act to bring about mental disturbance. This work would seem to be of great importance to neurologists and psychiatrists.

Professor Dorothy D. Johnson has embarked upon a research project dealing with regeneration of corneal tissue, in an attempt to demonstrate the identity of the cell types involved in the regenerative process.

Professor Charles A. Ely has extended his study of the effect of antigonadotropic serum on experimentally induced tumors of the reproductive tract in mice to those arising in ovaries transplanted to the spleen. Effective inhibition of growth of these implants has been observed.

Professor William M. Rogers has completed a study of the morphological adaptation of the temporomandibular joint to altered function in the monkey and man under a variety of conditions. With the collaboration of Professor Ralph A. Deterling of the Department of Surgery, progress is being made in the development of diagnostic criteria which may clarify certain cardiovascular problems. Simultaneous recordings of electrocardiograms and heart sounds on magnetic tape and photographic film are used. With Dr. Ralph Luskin, a resident in orthopedic surgery, electromyograms are being utilized to study quadriceps atrophy following knee injuries.

Dr. Carpenter completed a study of the physiologic effects and anatomic degenerations resulting from localized lesions of red nucleus in the rhesus monkey. Although transient tremor and ataxia were seen in some animals, these dyskinesias were never permanent. Tremor, ataxia, and cerebellar asynergic phenomena are observed only in those animals with lesions which extended caudally into the decussation of the *brachium conjunctivum* and produced degeneration in the descending limb of the *brachium conjunctivum*.

Studies relating to the basic neural mechanism responsible for subthalamic hyperkinesia in the rhesus monkey are in progress. Dr. Moss's research has centered about the problems of skeletal growth and morphology. Fetal de-

velopment has received special attention. The etiology of congenital human malformation, cranial and craniofacial, has been studied with especial attention to the morphology of the skull base. Work in progress on cleft palate and cranial dysostosis is aided by his participation as a member of the maxillofacial clinic. He has completed a study on the growth of the rat skull as affected by growth of the brain. Studies are being continued on sutural maturation under experimental conditions.

Dr. Hovde has continued his work on the anatomy and electrophysiology of the basal ganglia, and has recently extended the research to include the connections of the subthalamic nucleus. Studies on the brain of the rodent (golden hamster) are being carried out to aid elucidation of some of the anatomic problems encountered throughout this work.

Dr. Cooper has completed an analysis of succinic dehyrogenase activity of cardiac muscle in the pre- and postnatal rat heart. Cytological studies concerning the possible differences in components of atrial and ventricular cardiac muscle fibers are being carried out. In collaboration with Professor Copenhaver, studies are in progress pertaining to the distribution of succinic dehydrogenase in the early development of the amphibian heart, as well as a regional analysis of the different chambers of the adult heart.

Professor Emanuel Kaplan has completed an extensive study on the comparative anatomy of the knee joint in relation to surgical applications in the human. He has also continued his study on the physiology and surgery of the hand.

Professor Harry H. Shapiro completed a textbook on maxillofacial anatomy which has been published by J. B. Lippincott Company. In collaboration with Dr. Sidney Horowitz of the Department of Dental and Oral Surgery, he has finished a study of the effect of removal of the masseter muscle in the rat upon the skull and jaws. He has also developed a technique for cephalographic diagnosis in maxillofacial deformities.

Professor Detwiler has continued his investigations of the inductive and formative influence of the spinal cord upon the vertebral column. The results in general show that the spinal cord not only induces the vertebral arches, but is also largely responsible for their architectural ensemble. These studies, carried out in collaboration with Dr. Howard Holtzer of the University of Pennsylvania, have elicited considerable interest on the part of orthopedic and neurological surgeons in connection with congenital defects in the cord and vertebral column of newborn children.

Professor Detwiler has been active in his capacity as president of the American Association of Anatomists. The association held its 1955 meeting at the Jefferson Medical College of Philadelphia on April 6–8. Professor Detwiler delivered, among others, papers before the National Academy of Sciences, the New York Academy of Medicine, and the American Philosophical Society.

DEPARTMENT OF ANESTHESIOLOGY

Professor Emanuel M. Papper, Executive Officer

Instruction in anesthesiology is given as part of the second- and third-year courses in surgery. A demonstration of anesthesia in man is given as part of the course in pharmacology.

Through the generous cooperation of Professor George H. Humphreys II of the Department of Surgery, more time in the course in surgery will be made available for instruction in anesthesiology. Under the new arrangement each third-year student will receive ten didactic exercises and approximately twelve hours of demonstration in the operating rooms of the Medical Center. In the fourth year there will be one week of clinical clerkship in anesthesiology. During this period the students will have practical exercises in the administration of anesthetics and will participate in the rounds and conferences of the department.

The elective periods in the third year continued to be satisfactory to those students who participated. Opportunity on an elective basis was also available to students who participated in laboratory research. The educational exercises on the graduate level have continued without significant change. The residency program has developed in a satisfactory manner.

It was reported previously that the physical space available for investigation is increasingly cramped. Nonetheless the productive work of previous years was enlarged in some respects during this last academic year. Professor Duncan A. Holaday continued his work on micromanometric methods for the analysis of respiratory gases in whole blood containing volatile anesthetic agents. Research this year focused on some technical problems associated with the methods. Professor Holaday continued his study with Professor Shih-Chun Wang of the Department of Physiology and Messrs. Edgar Haber and Kurt W. Kohn, medical students, on the identification and localization of respiratory neurones in the medulla oblongata of the cat. This work was presented before the Columbia-Presbyterian Medical Society on the evening devoted to work by medical students.

In collaboration with Dr. Hubert L. Rosomoff, resident in neurological surgery, Professor Holaday carried to completion the study of cerebral blood flow and cerebral oxygen consumption in the dog during hypothermia. Professor Holaday also assisted Dr. Rosomoff in his studies of the effects of cerebral ischemia induced by the interruption of cerebral arteries during hypothermia. Preliminary findings indicated that reductions in body temperature protected the brain against anoxic necrosis under these conditions.

Professor Holaday also conducted studies in collaboration with Dr. Jacob Israel, a resident in anesthesiology, upon the work of respiration before and during general anesthesia. They also completed tests for the Army Chemical Corps Medical Laboratories of a mouth-to-mask resuscitation apparatus in-

tended for use by the Armed Forces. Professor Holaday and Drs. Eleanor C. Nelson and Vance Lauderdale, Jr., are studying the influence of temperature on the CO_2 content of whole blood and its distribution between plasma and red cells. This investigation is concerned chiefly with problems in methodology at the present time.

Professors Holaday and Lester C. Mark continued their work on the methods of measuring cardiac output based on the Stewart formula and the use of a radioactive isotope in place of the blue dye. Problems of instrumentation occupied most of the time during this past year. Professor Holaday assisted Professor Alvan L. Barach and Dr. Gustav J. Beck of the Department of Medicine in their studies on the effects of induced anoxia of varying degrees in the treatment of malignant disease. Professor Holaday made measurements of arterial blood gas tensions and acid base balance during these periods of prolonged hypoxia.

Professor Virginia Apgar continued collecting data correlating the intellectual and emotional development of children whose capillary bloods were measured for respiratory blood gases at the time of birth. This project is a collaborative one in association with Professor Howard C. Taylor, Jr., of the Department of Obstetrics and Gynecology, Professor Rustin McIntosh of the Department of Pediatrics, and Dr. Bertram R. Girdany. The statistical phases of the work were aided by the advice of Professor Holaday.

Professor Apgar showed that the insufflation of oxygen into the stomach of adult and immature dogs is unsatisfactory for the saturation of arterial blood with oxygen. This is an important demonstration since gastric insufflation of oxygen has become an accepted method of resuscitation of the newborn in some institutions. Professor Apgar's method of objective "scoring" of newborn infants has now been applied to more than ten thousand babies. It is planned to test these infants five years hence and compare the scores achieved at birth with the intellectual and emotional development at that time. In collaboration with Dr. William A. Silverman of the Department of Pediatrics, Professor Apgar continued the study of respiratory obstruction in the premature infant by the development of a "retraction score." In collaboration with Dr. Silverman, Dr. William A. Bauman of the Department of Pediatrics, and Professor Frederic J. Agate, Jr., of the Department of Anatomy, Professor Apgar participated in the development of an automatic method of X ray of the chest of newborn infants. With Professor Agate, Professor Apgar also studied the temperature of the newborn after birth and made recordings of rectal temperature for periods up to the first two hours of life.

Professor M. Jack Frumin continued his development of an anesthesia apparatus for the automatic administration of nitrous oxide oxygen and succinylcholine in collaboration with Mr. Arnold Lee. During the past year, many mechanical and electrical improvements were made in the apparatus so that

it has become much more efficient in operation. Preliminary work was completed on a device for the automatic injection of succinylcholine based upon the appearance of spontaneous respiration. A few electroencephalographic tracings of patients undergoing this type of anesthesia were made in collaboration with Professor Eli Goldensohn of the Department of Neurology and Dr. John Schweiss. In a small number of observations it was found that the electroencephalographic pattern was essentially normal despite obvious clinical unconsciousness and artificial respiration in an apneic patient. Professor Frumin and Mr. Lee won first prize in the Section of Scientific Exhibits of the Postgraduate Assembly in Anesthesiology for the development of their anesthesia apparatus.

Professor Frumin assisted Professor David Nachmansohn of the Department of Neurology in studies of the comparative activity of the enzyme choline acetylase in the ventral and dorsal roots of the dog and the ox. Preliminary results indicate that the dorsal roots contain sufficient enzyme activity to account for conduction resulting from acetylcholine breakdown in the nerve trunk.

Professor Mark continued his studies of the intravenous anesthetics in addition to the work previously described on the measurement of cardiac output. Professor Mark's studies of the barbiturates were carried out in association with Drs. Bernard B. Brodie and John Burns of the National Heart Institute and Dr. Caroline I. Campomanes of the Anesthesiology Service. Professor Mark and his associates found that thiopental penetrates the brain very rapidly and produces a brain/plasma ratio of concentration in thirty seconds which remains constant at twenty minutes and three hours after injection. At each of these times the drug is evenly distributed throughout the brain. The conclusion appears to be warranted that thiopental passes into the brain with extraordinary speed and explains the rapid response of patients to the drug. It appears probable that the rate of cerebral blood flow is the limiting factor in the distribution of thiopental in the brain. The rate of passage of barbiturates into the brain appears also to be related to their fat solubilities. The thiobarbiturates are more fat soluble and penetrate the brain a good deal faster than their less fat-soluble oxygen analogues. This conclusion is based on the studies of thiobarbital, thiopental, thiophenobarbital, and their oxygen analogues. Professor Mark and his colleagues also studied dolitrone. There appear to be very few important advantages in clinical or quantitative behavior between this compound and thiopental and the other agents studied previously. Professor Mark also began a study in collaboration with Professor Joseph F. Artusio and Dr. John Bellville of the Cornell University Medical College of the influence of body fat on thiobarbiturate anesthesia. Servomechanisms of electroencephalographic control of depth of anesthesia made this work possible.

Professor Herman Schwartz continued his clinical studies with Professor

L. Laszlo Schwartz of the Department of Dental and Oral Surgery on temporomandibular joint pain. They have been able to relieve many patients of this difficulty with the injection of "trigger" areas in the various muscles of the mouth. Professor Schwartz and Dr. Andrew de Roetth, Jr., of the Department of Ophthalmology began a study of the effects of relaxant drugs on intraocular pressure.

Professor Herbert Rackow developed his study of tissue acids during the year by working out the analytical methods of chromatographic analysis. He will shortly begin studies of the influences of the anesthetized state on the elaboration of these organic acids. Professor Holaday assisted in this work.

Dr. Bernard R. Fink continued his studies of the mechanism of laryngeal closure and opening of the larynx by radiographic methods in association with Professor Juan M. Taveras of the Department of Radiology; by electromyographic methods in association with Drs. Milos Basek and Vladimir Epanchin of the Department of Otolaryngology and Professor Holaday. Dr. Fink demonstrated further that a venturi effect of the glottis can precipitate laryngeal closure. These studies suggested a new classification of laryngeal spasm and have led to Dr. Fink's designing a new laryngoscope and new airway. Dr. Fink also studied the comparative anatomy of the larynx in the dissecting rooms of the Department of Anatomy and in the American Museum of Natural History.

Dr. Johannes Bartels has been working on methods for the quantitative analysis of the hypotensive agent, arfonad. Dr. Bartels plans to correlate the physiological disposition of arfonad with the amount of anesthesia which is necessary for a given depth of anesthesia. Dr. Ernest Salanitre participated in the clinical aspects of the problem on hypothermia. He was associated with the work carried on in collaboration with Professor Holaday and Professor Joseph Ransohoff of the Department of Neurological Surgery.

In addition to the studies in hypothermia, Dr. Eleanor C. Nelson has been engaged in a clinical study of the effect of chlorpromazine as a potentiator of relatively nonpotent anesthetic gases.

Dr. Marilyn M. Kritchman conducted preliminary investigations on the hypnotic and analgesic power of tetrahydrozoline. This drug also appears to potentiate some of the actions of diethylether to a considerable extent.

Dr. Norman Bergman has been reviewing the problems in anesthetic management of patients with meningocele and spina bifida. Because of the anatomic malformations associated with these lesions, untoward effects on respiration and on the circulation may occur without warning during operation.

Dr. Rita Jacobs conducted clinical studies with reserpine for preanesthetic premedication. Reaction of this drug is too unpredictable despite different methods of timing and dose administration and is not suitable for preoperative sedation. Dr. Jacobs also studied a new topical anesthetic agent which is less toxic than procaine in animal testing.

Members of the department continued their activities in the societies devoted to anesthesiology and its related sciences. Particular responsibility was accepted for functions of the Subcommittee on Anesthesia of the National Research Council, the American Board of Anesthesiology, the Section of Anesthesiology of the American Medical Association, several committees of the New York State Society of Anesthesiologists, the Medical Societies of the County of New York and the State of New York, the Armed Forces, and Association of University Anesthetists.

During the year, Dr. Carter M. Ballinger left to assume charge of the Department of Anesthesiology at the University of Utah. Dr. S. H. Ngai was permitted leave of absence from the University; the leave will be extended to include a tour of military duty.

DEPARTMENT OF BIOCHEMISTRY

Professor Hans T. Clarke, Executive Officer

The only major change in the personnel of the department has been the assignment of Professor David Nachmansohn to a professorship. Professor Nachmansohn, who for many years held an academic title in the Department of Neurology, is the leader of a group whose investigations of the biochemistry of nerve conduction have gained international renown, and this change of assignment constitutes recognition of the essentially biochemical nature of his researches.

Of the fifty-five persons holding academic appointments in the department, twelve, including Professor Edgar G. Miller, Jr., Dean of the Graduate Faculties, have taken some part in the instruction of medical and dental students. The others have devoted their entire time to research.

Professor Erwin Chargaff and his group have continued their studies on the chemistry of nucleoproteins and nucleic acids, lipoproteins and lipids, and of enzymes involved in nucleotide metabolism. Together with Professor J. N. Davidson of the University of Glasgow, he has served as editor of a two-volume treatise on the nucleic acids which has been published recently. He has also joined, on invitation, the editorial board of *Biochimica et Biophysica Acta.*

Professor Hans T. Clarke has continued his work on the chemical modification of proteins and on attempts to prepare synthetic plasma extenders.

Professor Zacharias Dische has continued his studies on the mechanism of the enzymatic conversion of ribose-5-phosphate to hexose-6-phosphate in human red cells. This reaction has been found to proceed in four steps. The sugar phosphate formed in these four reactions has been tentatively identified and complete balances between substrate and reaction products have been obtained for the first two steps of the reaction chain. For this study new

specific colorimetric methods for the determination of aldopentose and tetroses were developed. Studies on the mucopolysaccharides of serum glycoproteins have been continued and progress has been made in their purification and in the study of their composition.

Professor Goodwin L. Foster was absent on sabbatical leave during the first half of the academic year and thereafter devoted all of his time to instruction.

Professor Samuel Graff of the biochemical division of the Francis Delafield Hospital, has continued his investigation on the cause, nature, and possible therapy of cancer. This has involved application of the methods of tissue culture to the study of the metabolism of surviving cells and the culture of viruses, the organic synthesis of metabolic intermediates, the chromatographic metabolites in cancer tissue, and the utilization of amphibian embryos in studies of metabolic inhibitors. He has continued his experiments on the isolation and characterization of the inhibitory substances present in the milk of certain types of mice. In his study of altered metabolism in human cancer by means of isotopically labeled intermediates, he has demonstrated that a foreign protein is synthesized in multiple myeloma and that nonspecific alteration of amino acid incorporation patterns are frequent occurrences in advanced cancer. A new and promising area of cancer research has been opened by experiments on hypoxia with Professor Alvan L. Barach and Drs. Gustav J. Beck and Hylan A. Bickerman of the Department of Medicine. These experiments not only indicate new therapeutic possibilities, but they also focus attention on the energy transfer mechanisms of the cancerous process.

Professor Maxwell Karshan, who has been in charge of the instruction of biochemistry to dental students, has continued his studies of the histochemistry of the gingiva and the effect of vitamins and methyl androstenediol in periodontal disease.

Professor David Rittenberg has continued his studies on the initial step in the enzymatic activation of substrates. Investigation of the enzyme hydrogenase indicates that a hydride of the enzyme is an intermediate in the reaction. He has also initiated some work on the mechanism of the bacterial reduction of nitrate to ammonia and on the preparation of inorganic analogues of hydrogenase.

Professor David Shemin has continued his studies on the biosynthesis of porphyrins and the metabolism of glycine via the succinate-glycine cycle. He and his group have isolated from duck erythrocytes an enzyme fraction which converts delta-aminolevulinic acid to porphobilinogen and have initiated studies to find the mechanism by which the latter compound is converted to heme. They have also continued their studies on the utilization of delta-aminolevulinic acid for purine formation. Professor Shemin attended a conference on porphyrins at the Ciba Foundation in London and lectured before the Harvey Society.

Professor David B. Sprinson has continued his work on the intermediates between glucose and the aromatic amino acids in bacteria, and has shown that delta-erythrose-4-phosphate and phosphoenolpyruvate are the products of glucose metabolism which are condensed to form the 7-carbon precursor of shikimic acid. The latter is known to be converted to phenylalanine, tyrosine, and other aromatic compounds.

Professor Stephen Zamenhof, in collaboration with Professor Hattie E. Alexander of the Department of Pediatrics, has continued his studies on stability of transforming principle (heredity determinants, DNA). He has also found that three unnatural (halogenated) pyrimidines can be introduced in vivo into deoxypentose nucleic acid of *Escherichia coli* and has continued his study on conditions and biological effects of such introduction, with special reference to the growth inhibition and genetical changes.

Dr. Gertrude Gottschall, associate in biochemistry, has undertaken the characterization and isolation of proteolytic enzymes present in normal and abnormal human blood cells. Measurement of proteolytic activities of different components of normal human blood and fractionations of normal leucocytes to determine the source of proteolytic activities have been carried out. With the methods now available for separating blood cells, early studies relating white cell function to enzyme activities in animal cells are thus being extended to fresh human blood cells.

DEPARTMENT OF DENTAL AND ORAL SURGERY

Professor Maurice J. Hickey, Executive Officer

Professor Houghton Holliday, former associate dean and executive officer of the department, has retired.

The department conducted the second of three conferences on dental teaching sponsored by the W. K. Kellogg Foundation. This was a three-day meeting and representatives from a number of other dental schools were present.

The second of the Annual Dental Alumni Awards for outstanding accomplishment in research was presented to Joseph Appleton, professor of microbiology at the University of Pennsylvania School of Dentistry. The award was presented at the alumni "Deans Day" program.

The Admissions Committee continues to be faced with the problem of selecting competent students from a declining number of applicants. Even more serious than the drop in the total number of applicants is the fact the applications received show a trend toward lower academic quality. All members of the committee have taken part in conferences with University predental advisers and have addressed meetings of pre-dental students.

Applications were received from nineteen states, the District of Columbia, Puerto Rico, Hawaii, and eight foreign countries. Accepted students represent

six states. The total undergraduate registration of 150 students represents ten states and one foreign country (China).

DENTAL CLINIC

During the twelve-month period, from May 1, 1954, to April 30, 1955, there were 14,204 admissions to the dental clinics. Of this number, 5,181 were new patients and 9,023 were former patients readmitted. There were 1,713 patients referred from the hospitals of the Medical Center; 552 teachers and students from Columbia University; 286 Medical Center or Columbia University personnel; and 4,001 from other sources. There were 45,287 clinic visits—a decrease of 588 when compared to 1953–54. The operative dentistry clinic completed 2,906 procedures, a decrease of 336. The prosthetic clinic completed 853 procedures, a decrease of thirteen. It should be noted that there were five fewer junior and senior students working in the clinic than in the year 1953–54.

DIVISION OF OPERATIVE DENTISTRY

This division, under the direction of Professor Carl R. Oman continues to be active in teaching and research.

Professor William H. Silverstein has been granted leave of absence for military service. Dr. George Lyons has been appointed to the staff as an assistant in dentistry.

Research programs include a continuation of the work of Professors Oman and Edmund Applebaum in the use of ultrasonic energy in cavity preparation. Professor Joseph M. Leavitt and Dr. Irving J. Naidorf are studying the bacterial flora of infected pulp canals. Professors Joseph Fiasconaro and Harold Sherman, in cooperation with the Department of Neurology, are working on the quantitative evaluation of dental pain and a comparison of clinical efficiency of high-potency local anesthetics. Professors Edward Cain, Fiasconaro, Sherman, and John W. Fertig from the School of Public Health and Administrative Medicine are evaluating the drug mephenesin for use as premedication in operative dentistry.

DIVISION OF ORAL SURGERY

This division, under the direction of Professor Joseph Schroff, provides undergraduate and postgraduate teaching. In addition, the oral surgery clinic serves the dual purpose of teaching and service clinic. Patients are accepted on the basis of their needs, with the attending staff providing care for those patients whose problems are not suitable for student care.

Daily seminars are held for those students assigned to oral surgery. These seminars are used to discuss cases seen in the clinic, and student participation is expected.

Professor William J. Savoy and Professor George W. Hindels are continuing their research on the use of vitallium implants. Professor Joseph Schroff, in cooperation with surgical pathology, is continuing his study of the foliate papillae of the tongue.

The responsibility for teaching general anesthesia to postgraduate students has been assigned to Professor Morris Fierstein.

DIVISION OF ORTHODONTICS

This division, under the direction of Professor Arthur C. Totten, is to a considerable extent concerned with postgraduate teaching. The teaching to the undergraduate students of the prevention and correction of simple types of malocclusion is designed to make it possible for the dentist to render a valuable service without the necessity for specialist care.

The division is carrying on an active research program. Included are continuing studies of the temporomandibular joint, an investigation of the relationship between obturators and speech in cleft palate cases; radiographic findings in Cooley's anemia; a serial study in mixed dentition; and the effect of orthodontic appliances on the caries rate in children.

The division held a one-day seminar and three "information nights" for the members of the Orthodontic Alumni Association.

The demand for admission to the certificate course in orthodontics continues to be far in excess of the numbers that can be accepted.

DIVISION OF PEDODONTICS

The division of pedodontics is directed by Professor Solomon N. Rosenstein. One hundred and thirty-five children were admitted to the clinic. There were approximately 1,380 individual sittings. The average number of visits per child was 10.2. The total number of restorations and completed treatments was 1,695. Throughout the year, we maintained an average of 1.2 fillings or completed treatments per visit per child. Forty-two cases requiring pulp management procedures were treated and demonstrated.

Dentistry for preschool-age children has been neglected by most dental practitioners. To overcome this lack of attention and training and to broaden the significance of our teaching of pedodontics, the division has continued to increase the number of preschool-age children admitted to the children's clinic. Their ages ranged from fifteen months to four and a half years. The very youngest of these children were assigned to our postgraduate pedodontics students, the others to the undergraduate students.

The curriculum for postgraduate pedodontics included a greatly expanded schedule of pedodontics conferences. During the first half of the year all factors pertinent to treatment planning and measures for control of oral disease in children were covered. During the second half of the year, factors relating to prevention of disease of the teeth and surrounding structures in

children were included. At the postgraduate level, there appears to be greater interest in, and awareness of, the need for emphasis on prevention, and we have therefore pursued this phase of dental care for children in great detail. We have attempted to develop a plan for evaluation of factors responsible for the high incidence of dental disease in children and recommendation for improvement.

Dr. Arnold C. Rosenberg successfully completed the two-year half-time postgraduate course in pedodontics. For his thesis he submitted a paper on the role of nutrition in dental caries, in which a group of twenty children with rampant caries was studied.

Research activities include studies on tooth conservation, studies to determine normal ranges of variation in tooth development and eruption, and a study of the relationship of high caries incidence in very young children to early feeding habits.

In addition to its undergraduate and postgraduate teaching program, this division is responsible for the fellowship program in dentistry for the cerebral palsied child.

DIVISION OF PROSTHETICS

The prosthetic division, under the direction of Professor Gilbert P. Smith, continues to concentrate on the teaching of undergraduate students. Constant effort has been made to improve both the methods of teaching and the subject matter presented.

In the complete denture section, teaching has been revised to permit use of the latest developments in oral physiology and of newly introduced materials. The removable partial denture section has continued its research on clinical cases and has developed several improvements in design and application of basic principles. The fixed partial denture work has been advanced by the development of new forms of diamond-cutting instruments, which contributed considerably to both the quality and quantity of the work performed by the students. In the dental materials section, research has been conducted on the handling of stainless steel in dental procedures, refinements in the copperplating of dies, the properties of gelatin sponge materials, and a continued study of silver amalgam alloys.

The technique courses in prosthetic and crown and bridge were reorganized to permit students to complete assignments on time and with the minimum of outside work.

DIVISION OF STOMATOLOGY

This division, under the direction of Professor Lewis R. Stowe, combines for administrative purposes the teaching of oral diagnosis, roentgenology, and periodontia.

The section of oral diagnosis and roentgenology, headed by Professor Edward V. Zegarelli, conducts the oral diagnosis clinic in addition to its teaching duties. Here, all new patients are first seen and distributed to the proper clinics. The reception of all new patients in a central location provides an excellent opportunity for student teaching. New patients are examined by the students and problems of diagnosis and treatment are discussed with the student. Staff members from other divisions are available and take part in these case studies.

The staff of the section of oral diagnosis and roentgenology have taken advantage of the abundant clinical material to carry on a very active program of clinical research. Included in their research program are studies of the idiopathic bone cysts; the cementoma; application of the Cornell Health Index to dental disease; and a survey of the oral reactions to antibiotic therapy.

The section of periodontia, directed by Professor Frank E. Beube, provides teaching to the three upper classes and to postgraduate students. Their work is seriously handicapped by the lack of physical facilities and staff. There should be at least one full-time teacher assigned to periodontia. Physical facilities, particularly for postgraduate teaching, seriously impair the expansion of this program. The inability to group the postgraduate students in one clinic area places an additional burden on the teachers and makes it virtually impossible to provide good teaching conditions. Professor Melvin L. Morris is continuing his study of reattachment and Professor Beube is studying tissue healing.

The periodontia staff presented an all-day seminar to the dental alumni association. This is part of the plan to provide a closer relationship between the school and the alumni association.

RESEARCH LABORATORY

The research laboratory, while greatly in need of space, is continuing to cooperate with other divisions and departments in the Medical Center with respect to basic research. The principal avenues of endeavor are still directed toward studies of growth and development of bone and other mineralized structures. With the addition of Dr. Irwin Mandel to the staff, the program is expanding to include histochemical studies of dental caries and dental calculus.

Dr. Edith Koyoumdjisky, the first Louise Ball Fellow in nutrition, is conducting studies on the effect of amino-acid deficiencies in pregnant rats upon the bones and teeth of the offspring. Other studies are being conducted with the Department of Anatomy, surgical pathology, the radiological research laboratory, the constitution clinic, and the Divisions of Periodontia, Operative Dentistry, and Oral Diagnosis.

POSTGRADUATE PROGRAM

The postgraduate program has been reevaluated and placed on a somewhat firmer foundation. This year an innovation in postgraduate dental education was instituted. A course entitled "Biological Principles of Dentistry" was substituted for all of the so-called "basic science" courses. This course was designed to integrate and correlate the basic sciences with clinical dentistry and was given to all postgraduate students enrolled in our postgraduate certificate program. This course was presented through the combined efforts of Professor Edmund Applebaum, Professor Herbert J. Bartelstone of the Department of Pharmacology, Professor Nicholas A. DiSalvo of the Department of Physiology, Dr. Solon A. Ellison of the Department of Microbiology, Professor Barnet M. Levy, Professor L. Laszlo Schwartz, and many others. Two years were required for the preparation of the course material and the teaching staff should be complimented on their tireless efforts in conducting the program. The course will be presented again next year with modifications.

We have forty-one postgraduate students in our certificate of training program and we have given short postgraduate courses to sixty-four dentists.

DIVISION OF DENTAL HYGIENE

The demand for graduates of this school continues to be far in excess of the numbers available. It is interesting to note that of the eleven graduate hygienists available for placement only three entered private dental offices. Four accepted positions in schools, one in a university, one in a hospital, one in a clinic, and one in public health.

The Medical Center dental prophylaxis clinic for adult patients functioned throughout the school year in the Ogur Clinic. During the academic year, a clinic for school children was held in St. Rose of Lima Parochial School, 164th Street and St. Nicholas Avenue. Patients were treated in this school, including twenty-eight complete treatments of topically applied sodium fluoride.

In February, 1955, a new clinic of six dental chairs and other equipment was organized and operated at St. Catherine of Genoa Parochial School, 508 West 153d Street. This clinic operated three half-days a week during the spring semester and provided 410 patients with inspection and treatment. One hundred twenty-eight children received prophylaxis.

As the classes of student dental hygienists increase in size, the facilities for providing dental health teaching opportunities must be considered. St. Rose of Lima and St. Catherine of Genoa schools have been most generous in permitting students to teach in the classrooms. As this year is an experimental year in school service, an evaluation of the value of instruction was undertaken. St. Rose of Lima School showed a great improvement in the number of children who had gone to the family dentist for partial or complete treat-

ment. The classroom teaching was well received by the teachers, who acted as critic teachers for our students. The results justify continuing this service, which provides our students with many additional opportunities for classroom teaching.

In addition, five cooperating teachers in public schools of Long Island and Westchester County have participated in the teacher observations and teaching program.

Placement of graduates in the public schools is resulting from the student teaching program.

DIVISION OF CLINICAL ORAL PHYSIOLOGY

This division, under the direction of Professor L. Laszlo Schwartz, is working steadily toward relating clinical research, teaching, and practice with basic physiological science.

Undergraduate as well as graduate teaching has been extended during the year. A postgraduate course on the diagnosis and treatment of temporomandibular joint pain and dysfunction, based upon the research of the temporomandibular joint clinic, was attended by twenty dental practitioners and specialists from various parts of the country. This course was given with the assistance of a group which represents many departments of the Medical Center and which is continuing investigations of temporomandibular joint disorders. Represented are Professor Herman Schwartz of the Department of Anesthesiology, Dr. Albert W. Grokoest of the Department of Medicine, Dr. Lewis J. Doshay of the Department of Neurology, Dr. Charles T. Ryder of the Department of Orthopedic Surgery, Professor Nicholas A. DiSalvo of the Department of Physiology, Dr. Ruth E. Moulton of the Department of Psychiatry, and Professor Juan M. Taveras of the Department of Radiology.

The results of continuing investigations are confirming the earlier conclusion that most temporomandibular joint symptoms result from a functional disturbance of muscles and not from disease. The treatment of temporomandibular joint symdromes by the use of therapeutic exercises is now being studied. Dr. Harold P. Cobin has completed a study which revealed that sudden or extensive mandibular movements as well as changes in the occlusion of teeth are important precipitating factors. Dr. Charles M. Chayes and Dr. Gerald Finkelstein, who is now serving with the United States Air Force, have developed a new and improved method of temporomandibular joint radiography.

DEPARTMENT OF DERMATOLOGY

Professor Carl T. Nelson, Executive Officer

One of the serious problems confronting medical education in the United States at the present time is the difficulty of establishing and maintaining

adequate full-time academic staffs in the smaller clinical departments. The small financial return offered in teaching and research, compared with that to be gained currently from private practice, has discouraged many young physicians from undertaking what might otherwise be productive academic careers. As a result, the nucleus of investigators devoted essentially to full-time research in the fundamental problems of dermatology is becoming smaller and smaller.

Departments of dermatology are being staffed more and more by physicians who must depend for the most part on private practice for their livelihood. Frequently they are also able to make significant contributions in the field of clinical investigation. It is unrealistic, however, to expect them also to carry the load of basic laboratory research, without which advancement of knowledge in any specialty must ultimately come to a halt.

During the past academic year, one major change in the undergraduate curriculum in dermatology was adopted. A program which materially increases the time previously devoted to case work teaching for fourth-year medical students at the United States Public Health Service Hospital, Stapleton, Staten Island, was begun under the direction of Dr. Benjamin J. Chester.

Changes in personnel in the department during the past year include the resignation of Dr. Eugene F. Kelley. Professor Paul Gross was promoted from associate clinical professor to clinical professor of dermatology.

The research and clinical investigative projects undertaken by members of the department during the past year continued to reflect a wide variety of interests. Professor George C. Andrews continued his long-term clinical appraisal of the methods used in the treatment of angiomas and various types of cutaneous malignancies. With Dr. Anthony N. Domonkos, he also completed a study of the special problem of cutaneous malignancy in the aged.

Professor Rhoda W. Benham has continued her studies on the morphological and biochemical attributes of pathogenic and nonpathogenic varieties of cryptococci. In collaboration with Mrs. Christine Alexio, Professor Benham also extended the investigation of the pathogenecity, antigenic structure, and serological classification of the genus *Candida*. Mr. J. Dennis Pollack, under Professor Benham's direction, has undertaken a study of the morphological and cultural criteria for the identification of the genera *Actinomyces* and *Nocardia*.

Dr. Harvey Blank and Dr. George W. Hambrick, Jr., initiated a study of the influence of various hormones on the development and secretory activity of the sebaceous glands, using a technique of whole mounts of unfixed tissues. Dr. Helen O. Curth continued the study of the relationship of acanthosis nigricans and other dermatoses to visceral malignancy. Dr. Domonkos completed a study of the threshold erythema dose of low voltage X rays and has undertaken an investigation of neutron activation analysis of arsenic in normal skin, keratoses, and certain types of cutaneous epitheliomas.

Professor Gross, in conjunction with Drs. Chester and Milton B. Sloane, completed a study of the alkali-neutralizing properties of the skin in various eczematoid states. The results of this work have now been published. Dr. Justina H. Hill has undertaken an investigation of the comparative effectiveness of treponemal agglutination and immune adherence tests in the diagnosis of syphilis. Dr. Hill has also initiated studies on the definition of the media requirements for the prolonged in vitro viability of *T. pallidum*. Professor Beatrice M. Kesten, in collaboration with Professor Benham and Dr. Margarita Silva, has continued an investigation of the clinical characteristics of infections caused by *T. rubrum* and the correlation of these findings with the nutritional requirements, pigment production, and virulence of this dermatophyte.

Professor J. Lowry Miller, with Drs. Hill, Marvin Brodey, and Meyer H. Slatkin, has continued the study of the behavior and persistence of the treponemal immobilizing antibody in the spinal fluid of syphilitic patients in various stages of the disease. Professor Miller has also begun a study of the premonitory significance of biological false positive reactions to the standard serological tests for syphilis.

Mrs. Julia M. Einbinder and Professor Nelson have investigated further the effects of the corticosteroids and other hormones on tissue electrolyte changes during anaphylaxis. With Mrs. Einbinder and Professor Nelson, Dr. Victor M. Torres initiated a study of blood glucosamine levels and the effects of the administration of psoralen derivatives in patients with psoriasis. Dr. William W. Quisenberry has undertaken additional studies on the specificity of the Kveim test in sarcoidosis. Dr. Brodey and Professor Nelson have completed a five-year follow-up survey of the results of corticosteroid therapy in pemphigus. This study was of particular interest to us inasmuch as it included some of the first patients with pemphigus to be successfully treated by this method.

Dr. Silva and Professor Benham have extended the investigation of the nutritional requirements of the dermatophytes and have obtained information on the interrelationships of the metabolic activities of these microorganisms and their pathogenicity for man and laboratory animals. Dr. Sloane completed a study of the use of the antibiotic, nystatin, in the treatment of moniliasis.

During the past academic year twenty papers and scientific articles were published by members of the department. The fourth edition of Professor Andrew's textbook *Diseases of the Skin* and Dr. Blank's new book *Viral and Rickettsial Diseases of the Skin, Eye and Mucous Membranes of Man* were also published during this year. The members of the staff also continued their active participation in the proceedings of dermatological and other scientific societies. During the academic year fourteen members gave scientific presentations at various medical meetings.

DEPARTMENT OF MEDICINE

Professor Robert F. Loeb, Executive Officer

One of the major functions of a department in a university of distinction is the development of young men and women who will go forth to fill posts of importance in other institutions. In fulfilling this function great care must be exercised not to permit depletion of the ranks of teachers and investigators to a point at which it is no longer possible to offer technical opportunities, intellectual guidance, and the spiritual climate essential for the development of these people. The loss of staff from the Department of Medicine in the past year and the anticipated losses through retirement in the next four years will seriously jeopardize the position of excellence which has characterized the department through the past decades. It is of vital importance that the means be found to recruit new staff in the next two years to avoid loss of continuity of a priceless tradition. To achieve this, the University must face up to the need of finding financial means in recognized competition with other institutions of learning to attract young men and women ready and able to dedicate themselves to a full-time career in academic medicine. Fortunately, significant donations to the Presbyterian Hospital have been made available to pay in full or supplement salaries of members of the Department of Medicine of the University. Notable among these are the Edward S. Harkness Fund, the Daniel G. Arnstein Fund, and the Alice Weisl Fund. These generous gifts have helped to hold the line in maintaining a strictly full-time staff and yet without augmentation of such funds from the University as well as the Presbyterian Hospital and without the willingness on the part of the University to raise the levels of salaries significantly, the future of the department lies under a cloud.

Professor Michael Heidelberger will leave the Medical Center this June to avail himself of a long overdue sabbatical year prior to his official retirement as emeritus professor in 1956. He has accepted membership at the Microbiological Institute at Rutgers University. Professor Heidelberger has won international recognition through his leadership in developing immunology and bringing it to the dignified level of a quantitative science. He has developed a "school" of immunochemistry at Columbia and his pupils now hold positions of importance throughout the world in this newly developed discipline. His current researches, described briefly below, attest to his continuing scientific growth at the termination of his long and productive career at Columbia. Professor Heidelberger will be sorely missed. His gracious humility, his unwavering integrity, his solid critique, his generosity to his fellow workers, his unbounded enthusiasm for his science, and his inspiration will long be remembered.

Lost to the department, also through retirement, is Professor J. Burns Amberson, who since 1938 has been visiting physician in charge of the Chest

Service of the Columbia Division at Bellevue Hospital. Professor Amberson is known throughout America and Europe as an authority on diseases of the chest. His scientific contributions have gained the broadest recognition. His capacities as a teacher of medicine have attracted outstanding graduates to his service from all corners of the earth, and as they have gone forth to carry on his precepts, they have taken along admiration of and affection for his wisdom and sterling qualities of character. Happily, Professor Amberson will continue as consulting physician to Bellevue Hospital and will continue to teach.

It is a pleasure to record the promotion of Dr. Frederick A. Bailey from associate professor of clinical medicine to professor of clinical medicine, of Dr. Julia M. Jones from assistant to associate professor, of Dr. Réjane M. Harvey to assistant professor of clinical medicine, and of Dr. Hylan A. Bickerman to assistant clinical professor of medicine.

Untimely death claimed two young members of the department in the past year. Dr. John R. West, who had just been appointed assistant professor of medicine and who was an established investigator of the American Heart Association, died after a short illness on June 29, 1954. Dr. West already had a distinguished record of scientific accomplishment and had established an enviable name as a teacher and clinician—a brilliant future seemed assured to him. Dr. John G. Hawley, assistant in medicine, died on February 22, 1955, after a long and distressing illness. His indominatable spirit, his courage to carry on in practice and teaching and the care of the sick revealed an inspiring fortitude. His host of friends and admirers have established in his memory the John G. Hawley Lectureship in the Medical School.

It is with profound regret but also with a sense of pride that a number of resignations are announced. Professor Gilbert H. Mudge has resigned to become professor and head of the Department of Pharmacology and Experimental Therapeutics at the Medical School of Johns Hopkins University. Professor Irving M. London has resigned to become professor of medicine and head of the Department of Medicine at the Albert Einstein Medical School of Yeshiva University. Professor I. Herbert Scheinberg is resigning his post to accompany Professor London as associate professor of medicine and Dr. Charles W. Frank has also resigned to become assistant professor of medicine at the same university. Dr. Edward E. Fischel resigned to become director of the Medical Service at the Bronx Hospital. Dr. David Schachter is on military leave, and Dr. Daniel L. Larson has recently returned as a Markle Scholar after two years of military duty.

Dr. John H. McClement has been appointed a full-time associate professor and visiting physician in charge of the Chest Service at Bellevue Hospital to succeed Professor Amberson. Professor McClement is currently assistant professor of medicine at the University of Utah and was formerly associated with Professors Amberson and Cournand at Columbia. Dr. Alfred P. Fish-

man has been promoted to assistant professor and will head the cardiorespiratory laboratory at the Medical Center. Gifts from Daniel G. Arnstein, Dana C. Clark, and Henry T. Mudd to the Presbyterian Hospital have permitted the acquisition of apparatus which will greatly enhance the research potential of this laboratory.

During the past twelve months a number of distinctions have come to members of the department. Professor London and Dr. Helen M. Ranney addressed the International Hematological Congress in Paris. Dr. Ranney was the recipient of the Joseph Mather Smith Prize of Columbia University for her studies on hemoglobin. Professor Franklin M. Hanger became a member of the American Board of Internal Medicine and a member of the Conseil Scientifique of the Révue Internationale d'Hépatologie. Professor Alfred Gellhorn lectured in a number of South American universities and was made a member of the Argentine Medical Association, the Medical-Surgical Society of Venezuela, and various cancer societies. Professor Joseph W. Jailer was made corresponding member of the Royal Belgian Society of Obstetrics and Gynecology. Professor George A. Perera and Dr. Edward E. Fischel lectured before the Second World Congress of Cardiology and the former was elected a corresponding member of the Argentine Society of Cardiology.

Dr. Calvin H. Plimpton delivered a paper at the International Gerontological Congress in London. Professor Charles A. Flood was made honorary foreign and corresponding member respectively in the Uruguayan and Venezuelan Societies of Gastroenterology and addressed the International Congress of Gastroenterology in Brazil. Professor Yale Kneeland continued to serve as chairman of the Scientific Advisory Council of the Common Cold Foundation. Professor David Seegal was elected vice-president of the Association for Research in Nervous and Mental Diseases. Professor Karl Meyer has been invited to deliver a Harvey Society lecture. Professor Charles A. Ragan continued as chairman of the Metabolism and Nutrition Study Section of the National Institutes of Health. Professor John V. Taggart delivered the Morris Henry Nathanson lectures at the University of Southern California. Professor Jones was elected president of the New York Trudeau Society and Professor Amberson delivered the Harlow Brooks lecture of the New York Academy. Professor Robert F. Loeb received the honorary degree of Doctor of Science from New York University. He was elected a corresponding member of the Royal Belgian Academy of Medicine and a member of the Norwegian Medical Society. He became a trustee of the Rockefeller Institute for Medical Research and served as president of the Association of American Physicians.

A number of fellows from foreign universities have participated in research activities in the Department of Medicine during the past year. Included are Drs. Bernt Hökfelt and Kurt Bertil Björklund of Stockholm; Dr. Donald Longson of the University of Manchester; Dr. Owen L. Wade, Rocke-

feller Foundation Fellow from the University of Birmingham; Dr. John R. K. Preedy of London Hospital; Dr. Jean E. Thin, Fellow of the French National Research Council; Dr. Maurice Frenkel of the University of Amsterdam; and Dr. Felix V. Córdoba from Mexico. As in the past American Fellows of the following organizations have been participating in research: the National Research Council, the U.S.P.H.S., the Life Insurance Medical Research Fund, the National Foundation for Infantile Paralysis, the American Cancer Society, the American Heart Association, the New York Heart Association, the Damon Runyon Fund, and others.

As aids in student teaching, two manuals have been prepared during the past year. Professor Joseph C. Turner has made available one in the field of clinical pathology. Professors Fishman and M. Irené Ferrer, with Dr. John H. Laragh and Professor Harvey, have published a handbook of cardiology with assistance from the National Heart Institute.

As in the past years, the research program of the department has covered a broad range of activities extending from the most basic studies of the chemical nature of compounds which constitute connective tissue to descriptive observations on various disease entities and their natural history. It would seem wholly logical that this spectrum of investigation should be carried on in the department to bring greater understanding and integration of knowledge of the afflictions of man. Upon this knowledge ultimately depend their prevention and control.

Professor Meyer and his associates have continued work on the isolation, structure, enzymatic breakdown, and biological role of complex aminosugar-containing compounds. In the field of the mucopolysaccharides, their studies have led to the recognition of the complexity and specificity of the polysaccharides. Last year the isolation and characterization of two new mucopolysaccharides, chondroitin and keratosulfate, were reported. The fine structure of keratosulfate is as yet unknown. This work is being continued and applied to the arteriosclerotic human aorta.

The structure of hyaluronic acid, starting with the isolation of the repeating disaccharide unit, is now established. The work was done in collaboration with Dr. Maurice M. Rapport and was continued by Drs. Bernard I. Weissman and Felix E. Hoffman. The structure of chondrosin, the repeating unit of chondroitin sulfate A and C and of chondroitin, has been, at least in part, established in collaboration with Dr. Eugene A. Davidson. The existence of two distinct types of hyaluronidases has been demonstrated. One of these, exemplified by testicular hyaluronidase, has been studied in collaboration with Dr. Weissmann. A most striking demonstration of the transfer mechanism of testicular hyaluronidase was the in vitro production of hybrid oligosaccharides of mixed chondroitin sulfate and hyaluronate parts in collaboration with Dr. Hoffman. The bacterial hyaluronidases have been shown, in collaboration with Dr. Alfred Linker, to hydrolyse hyaluronate to a disac-

charide containing an unsaturated glucuronide. In collaboration with Professor Gabriel C. Godman, Dr. Henry D. Grossfeld and Dr. C. Andrew Bassett of the Department of Orthopedic Surgery, the production by fibroblasts of various origins in tissue culture of at least two mucopolysaccharides was shown.

Quantitative immunochemical studies by Professor Heidelberger on the polyglucoses have been extended with Dr. Felix V. Córdoba, visiting fellow from Mexico, to rabbit antisera to Types IX and XII pneumococci and to anti-typhoid and anti-paratyphoid B. horse sera.

Dr. Björklund of Stockholm, working with Professor Heidelberger, has found that the beta-amylase limit dextrin precipitated more antibody from several cross-reacting antisera than did the intact glycogen from which it was prepared, adding weight to earlier evidence that the 1, 4, 6– glucose branch points, more exposed in the dextrin, are concerned in this reaction. Professor Heidelberger and Mr. John Adams, a graduate student, have continued studies on the immunological properties of galactans. The long-known Type II cross-reaction has now been interpreted in chemical terms. The results necessitate a revision of the presumed structure of gum arabic. The type-specificity of pneumococcus II has also been separated into three partial specificities, each characteristic of the appropriate linkage of one of the component sugars of the specific polysaccharide of Type II pneumococcus, rhamnose, glucose, and glucuronic acid.

Dr. Otto J. Plescia and Mr. Kenneth Amiraian, associated with Professor Heidelberger, have made further studies on the thermodynamics of immune hemolysis and complement fixation. With these and other related data it now seems possible to account for the dependence of the overall immune hemolytic reaction on concentrations of reactants.

With Professor Cushman D. Haagensen of the Department of Surgery, attempts were made to isolate the Bittner mouse milk factor by column electrophoresis.

Professor John V. Taggart and Dr. David Schachter continued their studies on the biosynthesis of acyl amino acids and on the relationship between these synthetic reactions and the renal tubular excretion of p-aminohippurate. The present observations provide the means of explaining the effects of acetate and certain other normal metabolites on the transport mechanism. A new enzyme capable of synthesizing acyl derivatives of L-alanine has been discovered in rabbit liver. Mr. Peter T. Rowley and Mr. Fred H. Katz, working with Professor Taggart during periods of elective student research, have examined the effects of maleic acid on renal function in the dog. Dr. Richard J. Cross, Walter W. Palmer Fellow, has been investigating the phosphate exchange of rabbit liver mitochondria, expanding studies which he carried out here six years ago. The ultimate objective of this work is to uncover some of the mechanisms whereby cells move electrolytes against a concentration

gradient. It is also hoped that in the course of this work information can be obtained about the steps involved in the formation of phospho-enol-pyruvate by mitochondria.

Professor Gilbert H. Mudge, in association with Dr. Helen M. Anderson, has continued his studies on the mechanisms of electrolyte transport. The studies offer an explanation for the paradoxical aciduria observed in patients with hypokalemic alkalosis. These problems have been further explored by Professor Mudge in collaboration with Mr. Byron Hardin, a third-year student.

During the past year, studies on the metabolism of hemoglobin and of bile pigments and on the metabolism of the erythrocyte have been further pursued in the laboratory of Professor London. In collaboration with Mrs. Helina Morell, further studies on the synthesis of heme in vitro in non-intact preparations of duck erythrocytes have revealed that acetate and succinate inhibit the utilization of glycine for the synthesis of protoporphyrin. The effects of lead and of other heavy metals on the synthesis of heme in vitro have also been investigated. The effects of lead and of other heavy metals have been investigated on the condensation of two moles of delta-amino-levulinic acid to form porphobilinogen.

In collaboration with Miss Grace Vanderhoff and Dr. Plescia, the relationship of immune hemolysis to the age of the erythrocyte has been studied. The role of metabolic agents in modifying the susceptibility of the erythrocyte to immune lysis is being investigated. With Dr. Philip Aisen, Professor London has continued studies on the origins of bile pigment in the mammalian organism.

In conjunction with Dr. Bertram A. Lowy, Professor London studied the metabolism of nucleotides in mature and immature mammalian erythrocytes and in avian erythrocytes. Preliminary experiments indicate that mature mammalian human erythrocytes are unable to utilize glycine-2-C^{14} for the biosynthesis of the adenine moiety of adenosine triphosphate in vitro, whereas the immature nucleated erythrocyte of the duck appears to possess this biosynthetic capacity. Similar studies in the rabbit reticulocyte are now in progress. Professor London, with Drs. Aisen and Lowy and Miss Vanderhoff, studied the relationship of the osmotic fragility of human erythrocytes to their metabolic activity.

Dr. Frenkel of the University of Amsterdam studied the mechanism by which iron is transported across the mucous membrane of the intestine.

Studies of Professor Bradley on the behavior of the splanchnic vasculature have continued during the past year in collaboration with Drs. Burton Cominsky, Henry O. Wheeler, Alfred W. Childs and Owen L. Wade. Dr. Wheeler has devised an ingenious method of blood sampling: timed collection within a length of plastic tubing which may be sectioned into segments containing blood withdrawn over intervals as slow as one second. This

method makes it possible to compare second-to-second changes in concentration in arterial and hepatic venous blood and permits analysis of the differences in time-concentration curves in terms of circulation time. Thus, a means is provided of evaluating the contributions to outflow made by the various components of the splanchnic vascular bed.

In collaboration with Professor André Cournand, Professor Bradley and his associates are carrying on observations on the effect of hypoxia and exercise on hepatic blood flow and SBV. Dr. Cominsky and Dr. Wade have found that rose bengal may be used simultaneously with BSP to measure hepatic blood flow and are now attempting to measure maximal BSP uptake by the liver in dogs.

Dr. Childs, with Professor Bradley, has continued work on nephron delay time in the kidney. These studies are also being made in patients with renal disease in whom the pattern of delay differs from the normal—apparently as a result of the change in nephron population. Work with dextran analysis and clearance in patients with proteinuria has been continued in collaboration with Dr. Edgar Leifer, Dr. Childs, and Mrs. Katharine Baker.

In the past year Dr. John H. Laragh has continued studies of the electrolyte metabolism and of the hormonal factors in the production of edema. A study has been completed in normal dogs which confirms the fact previously demonstrated in patients with heart failure: that the sodium-depleted organism is exquisitely sensitive to the potassium ion. This point is of practical value in the treatment of certain clinical situations.

Another study has been completed by Dr. Laragh with the cooperation of Professor Harry B. van Dyke of the Department of Pharmacology which demonstrates, contrary to a popular concept, that the progressive ascites can occur in animals without demonstrable neurohypophysical function. The ascites is not modified by water restriction. In another study with Dr. Herbert C. Stoerk of the Merck Institute, it has been demonsrated that aldosterone, the powerful salt-retaining hormone of the adrenal cortex, is not stimulated by changes in serum sodium.

Further studies are being carried out on dogs with diabetes insipidus in an effort to define more clearly the mechanisms involved in the secretion of the sodium-retaining hormone. Parallel studies of these animal experiments are being done in patients with congestive heart failure. With Professor Mudge, Dr. Laragh has studied the possible relationship of renal distal tubular potassium secretion to water reabsorption in the dog with diabetes insipidus.

Professor Abbie I. Knowlton and Dr. Emily N. Loeb with Dr. Hökfelt have observed in rats that the effect on blood pressure of unilateral nephrectomy, with partial arterial infarction of the remaining kidney, is influenced by variation in dietary sodium. In collaboration with Dr. Stoerk, Professor Knowlton and Dr. Loeb observed that a direct relationship obtains between the weight of the adrenal glomerulosa zone in rats and the serum potassium

level over a wide range of variations in dietary sodium and potassium, an observation which appears to be correlated with Dr. Laragh's and Dr. Stoerk's finding of the effect of potassium on aldosterone secretion. With Dr. Stoerk, the influence of adrenal steroids on the growth, blood pressure, and serum electrolytes of the adrenalectomized rat has been extended.

$Delta_1$ cortisone was shown by Professor Knowlton and her associates to exhibit less life-maintaining activity than cortisone. Balance studies conducted by Professor Knowlton and Professor Joseph W. Jailer on four Addisonian patients have demonstrated the impressive sodium-retaining activity of 9-alpha-flurohydrocortisone given orally. This appears to be five to ten times the magnitude of DCA and like DCA may lead to hypertension.

Professor Jailer, with Drs. Longson, Nicholas P. Christy, Eleanor Z. Wallace, Helen B. Horowitz and Anne L. Davis, in the laboratories of the Department of Obstetrics and Gynecology, has continued studies on adrenal physiology and functional pathology. Studies of blood corticoids in certain patients with Cushing's syndrome suggest that their adrenal glands are peculiarly sensitive to ACTH. This group has also shown that this hyperresponsiveness, which also occurs in pregnancy, cannot be suppressed by the earlier administration of cortisone or prednisone as it can be in normal subjects. Professor Jailer has also been studying the biological activity of urinary gonadotropins in a variety of disorders not associated with pregnancy. Professor Jailer's group has also improved a method for assaying aldosterone in blood, with a view to studying its role in certain types of edema induced experimentally.

Professor Sidney C. Werner, in collaboration with Dr. Maryloo Spooner, introduced a new and simple test for hyperthyroidism. He is also investigating a new method of thyrotropin assay in conjunction with Professor George K. Smelser of the Department of Anatomy and Dr. Hans W. Neuberg. Previous studies upon the extent and rates of turnover of the inorganic and organic iodine of the body in healthy and diseased subjects have been extended in collaboration with Professors Howard Levene and Howard Levi of the Departments of Mathematical Statistics and Mathematics, respectively. Information suggesting that pituitary atropic hormones are little, if any, destroyed by the end organ has been obtained with Professor Frederic J. Agate, Jr., of the Department of Anatomy.

Two patients with the syndrome of the "fertile eunuch" have been identified pre-biopsy, and the histologic changes following gonadotropin therapy then observed, in collaboration with Professors Earl T. Engle of the Department of Obstetrics and Gynecology and John N. Robinson of the Department of Urology.

Professor Marcel Goldenberg and Dr. Hökfelt continued studies on catecholamines. A bio-assay method, employing the cat, has been developed for the determination of 3, 4- hydroxytyramine. They have shown that in-

jection of 3, 4- dopa leads to a significant increase in the nor-epinephrine content of the adrenal medulla of the rat and these studies suggest it may be a nor-epinephrine precursor. In contrast, 2, 5- dopa causes a decrease in the epinephrine content of the medulla.

Professor Perera continues his interest in hypertensive vascular disease, and his study of the natural history of the disorder, through the accumulated data of 500 hypertensives, is now complete. His studies of rauwolfia alkaloids indicate that these substances may produce sodium retention, edema, and congestive failure. He has also been engaged in studies employing sodium azide, prednisone, and the newer antihypertensive drugs, hexamethonium and pentapyrrolidinium. Finally, in contrast to the depressor effects of salt restriction in uncomplicated hypertensives, he has shown that patients with the accelerated phase of the disease do not respond. This last observation supports the view that pressor mechanisms are different in the "malignant" phase from those in operation in earlier stages of the disorder.

Dr. David S. Howell, with Professor Ragan, has completed a four-year study of cortisone administration to patients with rheumatoid arthritis. Half the original patients could not be continued on the hormone because of the development of toxicity, but those who were continued maintained their improvement. Dr. Baruch Blumberg carried out a retrospective study of Marie-Strumpell spondylitis indicating again the differences between this disease and peripheral joint rheumatoid arthritis. Dr. Blumberg, working with Professor Meyer, has studied the biophysical properties of hyaluronic acid in relation to the effect of electrolytes. Dr. Arthur I. Snyder, with Drs. Felix E. Demartini and Albert W. Grokoest and Professor Ragan, is conducting a study of patients with juvenile rheumatoid arthritis in whom it is believed the prognosis is possibly more favorable than in the adult form. Dr. Snyder has been studying the effect of the autonomic nervous system on the inflammatory response using the granuloma pouch technique. The tissue culture laboratory under Dr. Henry D. Grossfeld has continued to work actively with Professor Meyer and Professor Gabriel C. Godman of the Department of Orthopedic Surgery; an investigation of the production of polysaccharides by connective tissue cells in vitro is being carried on. Evidence has been accumulated, with Professor Raffael Lattes of the Department of Surgery, that the cortisone inhibition of connective tissue regeneration is overcome more by hyaline cartilage than by other tissues. Active cooperation with the Departments of Microbiology, Physical Medicine and Rehabilitation, Orthopedic Surgery, and the Columbia Division at the Goldwater Memorial Hospital has continued.

Professor Joseph C. Turner and Dr. Betty S. Roof have continued a study of the mode of action of antirheumatic phenolic acids. A methods of defining certain of the oxidation products has been developed and is being applied to animal tissues to obtain direct evidence as to whether quinones of gentisate may be formed in vivo in measurable amounts.

Professor Hanger, in collaboration with Dr. Thin of Paris, has been studying the clinical implications of a serological test employing specially prepared lipid emulsions. A number of disease entities with diffuse vascular injury give a positive precipitation, while the test in hepatic diseases is notably negative. Progress has been made in determining the nature of the abnormal constituents of the serum upon which the test depends.

Dr. Calvin H. Plimpton has continued his investigation of the mechanism of cortisone osteoporosis. He is investigating hypercalcemia in association with certain malignant tumors which do not have metastases. Dr. Kermit L. Pines has been making a comparative study of the vibratory sense in patients with diabetes as contrasted with nondiabetics. He has also, with Professor Bertram J. Sanger, been studying the usefulness of Lente insulin.

Since the death of Professor West, the cardiorespiratory laboratory has been under the interim direction of Dr. Charles W. Frank. The laboratory has continued to apply modern physiologic techniques to the diagnosis and evaluation of acquired and congenital heart disease as well as various forms of pulmonary insufficiency. The influence of certain hemodynamic factors on the elasticity of the lungs and the work of breathing has been under investigation with Dr. Gerard M. Turino. Measurement of the lung compliance has been made in a group of patients with mitral stenosis and documented pulmonary hypertension as well as in a number of patients with congenital cardiac lesions producing an increased pulmonary blood flow. Most of these patients have exhibited increased lung stiffness. It is planned to restudy these patients after surgical alleviation of the cardiac lesions. An isotope-injection technique for the measurement of the cardiac output in man has been further tested by comparison with the simultaneously determined Fick output. Dr. Frank has continued the follow-up studies on patients observed by him and Dr. Fischel in the Cooperative Study of Rheumatic Fever of the U.S.P.H.S.

Professor René Wégria, in collaboration with Dr. Hsue-Hwa Wong and Dr. Vincent V. Glaviano, continued study of problems concerned with coronary circulation, cardiac work, and metabolism. Two medical students, F. Bruce Lewis and Nicholas Yankopoulos, spent their elective period in his laboratory. Work is being completed on the effect of auricular tachycardia of progressively increasing rates on arterial blood pressure, cardiac output, coronary flow, cardiac work, and efficiency, as well as on the consumption of glucose, lactate, pyruvate, and oxygen by the heart. Investigation of the cause of cardiac failure in tachycardia is being continued. Preliminary experiments have been conducted on the effect of epinephrine and nor-epinephrine on coronary circulation, cardiac work, efficiency, and metabolism. Dr. Isidor Mufson has continued his studies of peripheral vascular disease, particularly the use of hyaluronidase.

Dr. Stuart W. Cosgriff has continued and extended his studies of anticoagulants in the management of thrombo-embolic disease. Extensive evaluation of the value of courmadin has been completed. Also, Dr. Cosgriff has

investigated the value of small oral doses of vitamin K_1 to stabilize the prothrombin levels of patients receiving certain anticoagulants. This procedure gives great promise of decreasing the hazards of anticoagulant therapy. Dr. Cosgriff has also continued his observations on the long-term anticoagulant management of patients who have suffered repeated embolic episodes. The safety and feasibility of this treatment on an ambulatory basis has been established. Professor Kenneth B. Turner is engaged in a long-term study of blood lipids in patients maintained on relatively high-fat diets. He is also studying the effect of plant sterols on the elevated serum cholesterol of otherwise normal patients.

Professor Alvan L. Barach, with the collaboration of Professor Hylan A. Bickerman and Dr. Gustav J. Beck, studied the effects of prednisone in 100 cases of bronchial asthma, pulmonary emphysema, and fibrosis. These investigators, with the additional collaboration of Professor Samuel Graff of the Department of Biochemistry, extended their study of the effect of altitude hypoxia on tumor growth. Both sarcoma 180 and carcinoma 755 were decisively inhibited in healthy mice and, by exposure to more severe hypoxia, destroyed in 40 percent of the animals thus treated. With the collaboration of Dr. Louis A. Scarrone and Dr. Beck, studies on exsufflation with negative pressure have revealed that expiratory flow rates could be significantly increased by such procedures as the inhalation of broncho-dilator aerosols and hyperextension of the neck, especially in the bronchoplastic types of pulmonary emphysema and bronchiectasis.

Professor Yale Kneeland and Mrs. Katherine M. Price are concluding studies of encapsulated staphylococci which will be the subject of a final report in the near future. Mrs. Price is also studying a new strain of influenza virus isolated in this laboratory in 1955.

Investigation of the treatment of the more difficult cases of ragweed allergy with alum-precipitated ragweed extract has been continued by Professor William B. Sherman. A study has also been made of the Prausnitz-Küstner reaction in regard to the relationship between various concentrations of antigens and antiserum in producing the reaction.

Dr. Ranney's studies of the varieties of human hemoglobin in association with various hemolytic states have continued to provide useful clinical information. In conjunction with Dr. Salome G. Waelsch of the Department of Obstetrics and Gynecology, Dr. Ranney has also continued studies of the two electrophoretically different hemoglobin patterns in inbred strains of mice. A genetic basis for these hemoglobin differences has been established.

Professor I. Herbert Scheinberg, in laboratories of the New York State Psychiatric Institute and the Presbyterian Hospital, has investigated the relationship between the abnormalities of copper metabolism and the deficiency of the plasma protein, ceruloplasmin, which characterize Wilson's disease. The results indicate that normal ceruloplasmin has a half-life of about four

days in patients with Wilson's disease. At the same time the effects of high-copper diets are being investigated in various species of animals, both with respect to pathological changes produced in liver and brain and to the effect, if any, on the ceruloplasmin level in the plasma of these animals. Studies on the chemical differences between various animal hemoglobins have also been carried out.

AT BELLEVUE HOSPITAL

Research activities in the First Medical and Chest Divisions have proved highly productive in the past year. The study of blood volume in congestive heart failure, by Professor André Cournand, Dr. Harry W. Fritts, and Dr. Philip Samet, has been completed. Dr. Fritts, with Professor Cournand and Professor Alfred P. Fishman, has compared the "oxygen cost" of breathing with the mechanical work of breathing as measured by pressure-volume relationships, and from these has calculated the mechanical efficiency of the moving tissues in achieving the exchange of air.

Professor Fishman and Dr. Aaron Himmelstein of the Department of Surgery have continued successfully their method of measuring the flow of blood through each lung separately, by simultaneous cardiac catheterization and bronchospirometry.

Professors M. Irené Ferrer and Réjane M. Harvey, with Professor Robert H. Wylie of the Department of Surgery, have continued to accumulate case studies of patients undergoing mitral commissurotomy. Their conservative approach, in the careful physiological study of each case prior to operation, is apparently justified, as demonstrated by the high percentage of successful results in recently operated cases. Dr. Eugene Braunwald, Professor Fishman, and Dr. Himmelstein have carried out a number of simultaneous pressure measurements, in various cardiac disorders, by direct needling of the heart chambers at operation.

Dr. Lynn Christianson, Dr. Fritts, and Dr. Samet have continued the study of various dextran fractions for the United States Army. British-made dextran lasts longer in the blood than American dextran, but gives a higher incidence of toxic reactions of allergic type.

Professor Jones and Dr. Robert R. Henderson have undertaken a study of extrapulmonary tuberculosis and its treatment. This is needed because the introduction of effective chemotheraphy has shown that our knowledge is insufficient. It includes such important conditions as tuberculosis of the lymphatic system and the genitourinary system. Tuberculosis of the female pelvic organs is being studied in cooperation with Dr. Gordon Douglas of New York University. A cooperative arrangement has been made with the Hermann M. Biggs Memorial Hospital, Ithaca, New York, for the long-term treatment of some of the patients included in this study, and a long follow-up of the results of treatment is planned.

The home care program, which Professor Jones and Dr. Frances S. Landsdown have organized and are conducting as a study and demonstration, is yielding tangible information. The following observations seem justified on the basis of present experience: (1) Many patients can be treated outside the hospital, provided they are selected according to certain strict criteria. (2) An important consideration is the possible hazard for persons in the home who may have contact with these patients. It seems to be safe for these "contacts" if the current criteria are observed. (3) The availability of closely correlated hospital facilities is an important asset in home care since patients, from time to time, require thoracic surgery or other ancillary services. (4) The rate of noncooperation among patients is about the same outside the hospital as it is inside. (5) A problem in home care is the difficulty of giving the patient proper and adequate instructions because of the infrequency and remoteness of contact of the staff with him. This, of course, is a necessary part of treatment and is better accomplished in the hospital.

An emphysema clinic has been inaugurated in our outpatient department under the immediate supervision of Dr. Walter A. Evans. This is a joint undertaking of the First Medical Division and the Chest Service and includes the study of specific problems as well as the improvement of treatment of afflicted patients.

As a continuation of our investigation of the effects of chemotherapy upon tuberculosis, Professor Marvin Kuschner of the Department of Pathology, Professor Jones, Drs. Bettina Garthwaite, Henry G. Schaffeld, James T. T. Chien, and Professor J. Burns Amberson are conducting a correlated study in the clinical, chemical, bacteriological, and morphological features of resected tuberculous lesions. The investigation includes determinations of pH and lactate concentration in the lesions, cultures of lesions on standard media and parallel cultures according to the special technique of Hobby, guinea pig inoculations, drug sensitivity studies, and histopathological studies of sections. As the material and information accumulate, the plan is to intensify the chemical studies.

On the First Medical Division, Dr. Charles T. Carman, Jr., Dr. Richard J. Conroy, and Dr. Enoch Saphire are investigating arterial oxygen and blood Co_2 and pH levels in acute myocardial infarction. Dr. Amanda Hoff and Dr. Elmer Alpert are studying the action of various vitamin B_{12} analogues in patients with pernicious anemia. Dr. Alpert and Dr. Harry Robinson are investigating two new antibiotics, spiramycin and cathomycin, supposedly active against gram-positive pathogens.

AT THE FRANCIS DELAFIELD HOSPITAL

Professor Alfred Gellhorn has continued studies on the chemotherapy of the malignant brain tumor, glioblastoma multiforme, in the human and the ex-

perimental animal. In a correlated study with Professor Margaret R. Murray of the Department of Anatomy, brain tumors from man and mouse have been grown in tissue culture and the effect of compounds has been tested. Those agents showing activity in vitro have been studied in vivo. In the area of clinical cancer chemotherapy, massive adrenocortical steroid treatment has been evaluated by Professor Gellhorn and Dr. Helen M. Ranney in the lymphomas and leukemias. In four of seven adults with acute leukemia, hematological and clinical remissions have been achieved by this regimen. In seven patients with far-advanced reticulum cell lymphosarcoma no longer responsive to other means of treatment, massive doses of adrenocortical steroid have produced objective as well as subjective remissions. Studies on tobacco tar carcinogenesis have been continued in Professor Gellhorn's laboratory with mounting evidence that the tar from cigarette smoke acts synergistically with subthreshhold doses of a known carcinogen to produce squamous cell epitheliomas on the skin of mice. The members of the staff at the Francis Delafield Hospital have carried out during the past year clinical evaluations on ThioTEPA (triethylenethiophosphoramide), Nonane (1-9-dimethanesulfonoxynonane), and an aromatic nitrogen mustard.

Professor Jack D. Davidson has continued his important investigations on nucleic acid metabolism in experimental tumors. During the past year he has developed methods for the liquid scintillation counting of radioactive carbon in purines. With Professor Philip Feigelson of the Department of Biochemistry, Professor Davidson has initiated enzyme studies to determine the precise biochemical locus at which antitumor drugs exert their effects.

Dr. Elliott F. Osserman has extended his observations of the characteristic abnormality in serum plasma proteins in seventy-five patients with multiple myeloma. The paper electrophoretic pattern of the serum and/or urine in seventy-three of the seventy-five patients has been diagnostic of this neoplastic disease. Dr. Osserman and Professor Graff of the Department of Biochemistry have conducted clinical experiments on the incorporation and turnover of N^{15}-labeled L-aspartic acid in the abnormal serum and urine proteins of a patient with multiple myeloma.

Dr. George A. Hyman has completed a series of instructive observations on the mechanisms of anemia in neoplastic disease. These results have given additional emphasis to previously made observations that a hemolytic factor in patients with neoplastic disease is the chief mechanism of the anemia so frequently observed. In collaboration with Professor Algernon B. Reese of the Department of Ophthalmology, Dr. Hyman has continued the evaluation of triethylenemelamine together with radiotherapy in the treatment of children with retinoblastoma. The results, recently summarized, indicated that more rapid and more adequate control of this tumor could be achieved with the combination than had been observed with radiotherapy alone.

Dr. Paul A. Marks has initiated studies to describe more precisely the electrolyte disturbances which are frequently observed in patients with dis-

seminated neoplastic disease. He has continued investigations on alternate pathways of glycogen synthesis and also has conducted further observations on the hemodynamics of the splanchnic circulation.

The excellence of clinical opportunities at the Francis Delafield Hospital in terms of teaching staff and patient material continues to offer a most desirable elective period for students who have completed their clerkships in medicine in the third year.

The most serious problem confronting the future of the Delafield Hospital is that of recruitment of a desirable house staff. This difficulty is one more and more frequently found in specialty services.

The University, as part of its graduate study program, is attempting to establish a rotating residency service through a number of its affiliated hospitals in which specialty training is undertaken. This would offer the attractive inducement of broader training.

AT THE GOLDWATER MEMORIAL HOSPITAL

At the Goldwater Memorial Hospital, Professor Forrest E. Kendall, Professor Margaret Bevans, Dr. Liese L. Abell, and Dr. Erwin H. Mosbach have continued their investigations on the natural history of experimental canine atherosclerosis, produced by the feeding of high cholesterol diets and thiouracil. They have determined the conditions required for the production and regression of the arterial lesions in short-term experiments. They are now studying the production and regression of lesions in dogs maintained on experiment over a period of years instead of months. An investigation is in progress to learn the effects of a 25 percent animal-fat diet on the serum lipid patterns of dogs.

Dr. Abell and Dr. Mosbach have continued cholesterol-balance studies upon euthyroid and hypothyroid dogs. It was demonstrated that dogs on high-cholesterol diets excrete all of the ingested cholesterol, either as unchanged cholesterol or as bile acids. The amount of cholesterol converted to bile acids is significantly decreased in the hypothyroid as compared to the euthyroid dog. Drs. Abell and Mosbach are carrying out cholesterol-balance experiments in rabbits. They are also studying the effect of long-term oral bile-acid administration on the serum lipid patterns of dogs and human subjects.

Dr. Seymour Dayton and Dr. Mosbach have completed their studies on the biological origin of biliary cholesterol and bile acids in the rat. Dr. Daniel Rudman and Professor Kendall have made observations on the fecal excretion of cholesterol and bile acids by rats on a fat-free diet. The ingestion of cholic acid does not alter the sterol balance significantly.

In conjunction with Dr. John J. Burns of the New York University Service, Goldwater Memorial Hospital, Dr. Mosbach has continued his studies on the bile synthesis of vitamin C.

Professor Alfred Steiner reports the development of moderate hypercholes-

terolemia in rabbits fed a cholesterol-free high-fat diet containing 50 percent peanut meal. Professor Steiner and Dr. Fletcher P. Riley were unable to demonstrate that the administration of up to 56 gms. of beta-sitosterol per day to nine patients resulted in a significant change in the individual basic serum lipid patterns. Professor Arthur R. Wertheim is studying factors influencing fat-tolerance tests in man and the dog.

Dr. Henry Lax, Dr. Arthur W. Feinberg, and Mr. James Blake are continuing their studies on peri-arterial pulse waves in digital and brachial arteries. Fifty of fifty-two presumably normal human subjects (96 percent) below the age of forty had normal pulse records with clearly defined initial and dicrotic waves. Forty-five of fifty-four patients (83 percent) ill of acute infections or cirrhosis of the liver also had normal pulse waves. In contrast, only five of 139 patients (4 percent) with arteriosclerosis marked by such clinical manifestations as myocardial infarction, cerebrovascular accidents, and peripheral vascular impairment had normal pulse waves. The major abnormality noted in the patients with arteriosclerosis was a diminution or disappearance of the dicrotic wave. The association of changes in the pulse wave with the development of experimental atherosclerosis in dogs is being studied in cooperation with Professors Bevans and Kendall.

Professor Quentin B. Deming, Drs. Arthur R. Schulert, Jeanne A. Epstein, Seta Torosdag, and Marion E. Hodes, and Professor David Seegal have continued their appraisal of a number of drugs proposed for the treatment of hypertensive vascular disease. Reserpine in large dosages (2–20 Mg. daily) was effective in lowering blood pressure even in the advanced stages of hypertensive vascular disease. At these dosages serious toxicity is common and consists usually of loss of energy, appetite, alertness, and even consciousness. These results suggest that in patients with severe hypertensive vascular disease reserpine may be both a more effective and potentially more toxic agent than has been assumed. The clinical effectiveness of various combinations of reserpine, hydralazine, and ganglionic blocking agents are being evaluated. Professor Deming, with Mrs. Phyllis Garland and Mr. Eugene Martin, is evaluating the effect of hypotensive agents on the course of experimental hypertension in rats. Dr. Schulert, Mr. Burton Palmer, and Mr. John Schweitzer have developed a new colorimetric method for the determination of hydralazine in biologic fluids. Dr. Schulert and Professor Deming are attempting to define the tissue distribution of hydralazine particularly with regard to its concentration in the erythrocyte. Studies are under way to learn if the hypotensive effect and toxic manifestations are related to the blood concentration of hydralazine.

In an investigation done both at the Mount Sinai Hospital and the Goldwater Memorial Hospital, Dr. Milton Mendlowitz has been studying pressure and flow in the digital circulation in normotensive and hypertensive subjects at various levels of digital arterial pressure produced by brachial artery compression.

Dr. Saul Cohen, Professor Arthur J. Patek, Jr., Dr. Ernest Schmatolla, and Professor Bevans have completed a phase of their study on experimental dietary cirrhosis in the rat. Dr. Hylan A. Bickerman, Dr. Burton M. Cohen, and Miss Sylvia E. Itkin are studying the air-flow dynamics of the normal and experimentally induced cough in human subjects; utilizing these data they are evaluating the antitussive and expectorant activity of various synthetic cough suppressants. With Dr. Lester L. Vargas of the Department of Surgery they are seeking to determine whether oxygen toxicity occurs in the presence of a normal arterial oxygen saturation.

Professor Alvan L. Barach, Professor Samuel Graff of the Department of Biochemistry, Dr. Bickerman, Dr. Gustav J. Beck, and Miss Itkin have continued their studies on the effect of anoxia in inhibiting the growth of experimental tumors (sarcoma 180 and carcinoma 755) implanted in mice.

Professor Bevans, in association with Professor Beatrice C. Seegal of the Department of Microbiology, has completed a study of the pathogenesis and natural history of nephritis in the dog produced by specific nephrotoxic antisera (described in the report of the Department of Microbiology).

DEPARTMENT OF MICROBIOLOGY

Professor Harry M. Rose, Executive Officer

During the year ten graduate students were enrolled in the department and one student completed requirements for the degree of Doctor of Philosophy.

The laboratories of the diagnostic service performed 82,239 examinations, of which 30,366 were serological tests for syphilis, a total increase of 11,980 examinations over the preceding year. The marked rise in work load was accompanied by a considerable turnover in technical personnel and ample evidence was gained that the conditions of employment in the diagnostic laboratory no longer compare satisfactorily with those offered by many outside agencies.

Dr. Stuart W. Tanenbaum initiated a new course in bacterial metabolism which has been added to the requirements for graduate students. Dr. Sam M. Beiser and Dr. Solon A. Ellison gave a course in techniques for handling bacterial viruses to the students and members of the department.

Professor Harry M. Rose was appointed a member of the Commission on Influenza, Armed Forces Epidemiological Board, and undertook direction of the Influenza Study Program at Fort Dix, New Jersey. Clinical and laboratory studies were conducted with the objective of comparing the efficacy of adjuvant and aqueous types of influenza vaccines as agents for prophylactic immunization. Dr. Alice W. Knox participated in this work. Professor Rose also continued work on antiviral substances, in collaboration with Dr. Bern-

ard F. Erlanger and Dr. Calderon Howe, as well as electron microscopic studies of viruses in tissues, in association with Professor Dan H. Moore and Dr. Councilman Morgan.

Professor Claus W. Jungeblut continued his research on the salivary receptor-destroying enzyme, previously discovered in his laboratory. In collaboration with Professor Franz J. Kallman of the Department of Psychiatry, a testing program was arranged with sets of identical and nonidentical twins in order to study the genetic background of the secretion pattern. Experiments with spider monkeys were continued with Dr. Gonzalo Bautista to investigate the mechanism of selective susceptibility in this animal to infection with Type I poliomyelitis virus. Also, studies on the in vitro adsorption of poliomyelitis virus to erythrocytes were further expanded. A new line of investigation was begun on in vitro reactions between certain polysaccharides and Col-SK virus.

Professor Beatrice C. Seegal, in association with Professor Margaret Bevans of the Department of Pathology and Mrs. Margo Hasson, completed a study of the natural history of canine nephritis produced by specific nephrotoxic antisera. The early renal lesions in the dog resembled those of acute glomerulonephritis in man. Animals surviving the acute phase usually developed chronic nephritis of many months' duration. Studies on the relation of specific renal antigens to the pathogenesis of both canine and murine cytotoxic nephritis were begun, utilizing antibodies tagged with fluorescein, according to Coon's technique. Studies of the effect of nephritis on experimental arterial disease in the rat were continued and the effect of hypertension on arterial disease (not associated with glomerulonephritis) was taken under investigation.

Professor Moore continued to collaborate with several members of the department in investigating the morphology of viruses and in studying virus-host cell relationships. Professor Moore also extended his investigation of factors which influence electrophoretic analyses and adapted to the moving boundary apparatus a method, making use of light interference, which increases the facility, sensitivity, and precision of electrophoretic measurements. With Dr. Helmut Ruska of the New York State Department of Health, he studied structural changes in muscle and capillaries following tourniquet injury (ischemia), and with Dr. George F. Crikelaire of the Department of Surgery he found that although the local application of ice to scald injuries reduces pain, swelling, and shock, it does not decrease the degree of burn nor the time of healing. In collaboration with Professor Ernest C. Pollard of Yale University and Dr. Ray A. Brown of Lederle Laboratories, Professor Moore obtained measurements of the vital areas of certain viruses by use of ionizing radiation. Professor Moore attended the Sixth International Cancer Congress and has continued his studies of the factor responsible for mammary carcinoma in mice. He continued to supervise publication of the International

Bibliography of Electron Microscopy for the New York Society of Electron Microscopists.

Professor John D. MacLennan, in association with Dr. Inez Mandl and Professor Edward L. Howes of the Department of Surgery, continued an investigation of the proteolytic enzymes of *Clostridium histolyticum*. Studies were also begun concerning the nature of toxemia in gas gangrene, and in this connection a number of different bacterial lecithinases were prepared in a highly concentrated and partially purified form. In collaboration with Dr. Howe, partial purification was achieved of a clostridial enzyme which specifically splits blood group A substance.

Dr. Margaret Holden continued and extended investigations concerning the effect of adrenocortical steroids on cells in vitro, with special reference to the action of cortisone and hydrocortisone on a pure strain of mouse fibroblasts.

Dr. Howe continued studies on the fractionation of human erythrocyte stroma. Attempts to characterize enzymes from *Clostridium tertium* were extended and methods for producing the enzymes were standardized. In collaboration with Dr. Mandl and Professor MacLennan, studies were continued on the separation of the various enzyme activities by standard fractionation procedures.

Dr. Erlanger continued studies of several synthetic decapeptides related to gramicidin S, including an examination of their physicochemical and antibacterial properties, with the purpose of elucidating the mechanism of action of these peptide antibiotics. Comparative surface tension data on cyclic gramicidin S and a synthetic, acyclic, antibacterial decapeptide, showed that they were equally effective as surface-active agents over a wide range of concentrations, from which it was concluded that the greater antibacterial activity of the natural (cyclic) product must be due to a more specific type of action. An enzyme which splits ornithine peptides was obtained in concentrated form from cell-free extracts of *Bacillus brevis*. In collaboration with Professor Rose and Dr. Howe, Dr. Erlanger also continued the investigation of antiviral factors in human sputum.

In association with Dr. Beiser and Professor Seymour Lieberman of the Department of Obstetrics and Gynecology, studies of hormonal antibodies were extended. Antibody elicited in rabbits by the injection of a bovine serum albumin-testosterone conjugate was found, by inhibition tests, to be specific for testosterone. Several new steroid-protein conjugates were synthesized—testosterone-egg albumin, testosterone-human gamma globulin, and cortisone-bovine serum albumin—and studies of their biological properties were begun.

Dr. Ellison studied strains of herpes simplex virus isolated over a period of years from one individual. Antisera were prepared to each of these strains in rabbits and chickens. In collaboration with Dr. Erlanger, an investigation of the effects of ultraviolet irradiation of bacteria was continued. The effect of

ultraviolet irradiation on pneumococcal transformation was taken under study in collaboration with Dr. Beiser, who also participated in work on the antibody response of chickens to antigens to which they has previously been exposed in embryo.

Dr. Morgan extended his electron microscopic studies of the morphology and development of viruses in thin sections of infected cells. Influenza virus appeared to develop at the cell surface and to be rod-shaped as well as spherical. Investigation of the "incomplete" forms of this virus as well as its development in several different host cells was undertaken. Two strains of vaccinia virus were observed to provoke differing responses in the host cell. In collaboration with Dr. G. H. Bergold of the Laboratory of Insect Pathology, Canadian Department of Agriculture, polyhedra of two insect viruses were shown to be composed of a macromolecular paracrystalline lattice enclosing bundles of rod-shaped viral particles. In collaboration with Dr. Kevin McCarthy, Professor John F. Enders, and Professor Thomas Weller of Harvard University, a study of vaccinia, measles, and chicken-pox viruses in tissue cultures was begun.

Dr. Beiser continued his investigation of the role of deoxyribonucleic acid (DNA) in pneumococcal transformation reactions. In collaboration with Dr. Aaron Bendich and Dr. Jacques Fresco of the Sloan-Kettering Institute and Dr. Rollin Hotchkiss of the Rockefeller Institute, pneumococcal transforming DNA was fractionated by ion-exchange chromatography and the various fractions were studied to determine whether or not separation of transforming activities had been achieved. In collaboration with Dr. Ellison, the effect of ultraviolet light on pneumococci and on transformation was studied. A study of steroid-protein complexes was continued in collaboration with Dr. Erlanger and Professor Lieberman. Hapten-inhibition studies established that antisera obtained from rabbits immunized with testosterone bovine serum albuminate are primarily specific for testosterone.

Dr. Tanenbaum conducted studies on the comparative biochemistry of chemoautotrophic and borderline heterotrophic bacteria with particular regard to their energy-trapping processes. Work was especially devoted to an examination of the metabolism of *Acetobacter peroxidans* with respect to the terminal respiratory pathway, oxidative phosphorylations, and hydrogen activating and transferring enzymes.

Dr. Friedlaender studied host-virus relationships in Ehrlich ascites tumor cells infected with various viruses (Anopheles A, Bunyamwera, Mengo) by examining ultra-thin sections in the electron microscope. Structures believed to be Anopheles A virus were identified and were also found in chorioallantoic membranes of infected chicken embryos. Work on the other viruses was continued and attempts were made to evaluate the results of infection on the host cell.

DEPARTMENT OF NEUROLOGICAL SURGERY

Professor J. Lawrence Pool, Executive Officer

Members of the Department of Neurological Surgery have again presented a course of lectures to the fourth-year medical students, and in addition Professor J. Lawrence Pool gave eight lectures in clinical neuroanatomy to Professor Adolph Elwyn's first-year class in neuroanatomy.

In conjunction with Dr. Hubert L. Rosomoff and the Department of Anesthesiology, Professor Pool has been particularly interested in the use of hypothermia during the surgical treatment of intracranial aneurysms. He has also continued his work in the treatment of Parkinson's disease by stereotaxic lesions of the globus pallidus. In addition, a study of pain relief and accompanying steroid and physiological changes relating to stereotaxic lesions and stimulation of certain portions of the frontal lobe has been made with Dr. William Kemp Clark.

Professor Fritz Cramer has been working on the neurosurgical myelographic study of a group of cases with tumors and other lesions of the cervical spinal cord co-existing with ruptured cervical intervertebral discs.

Professor Lester A. Mount has carried on a study of the results of treatment of patients with spontaneous subarachnoid hemorrhage and intracranial aneurysms, a study of the collateral circulation of the brain following cervical carotid artery ligation and various intracranial ligations, and continuation of a long-term study of treatment of premature synostosis.

Professor Edward B. Schlesinger has been studying a new technique for extracranial localization of brain tumors with radioactive isotopes, in collaboration with Professors Edith Quimby, Harald H. Rossi, and Juan M. Taveras of the Department of Radiology. With Dr. Henry Liss pre- and postoperative phosphatase studies are being made in cases of meningioma as a possible aid in diagnosis. The cardiovascular dynamics of arteriovenous fistulas of the brain are also being studied by Professor Schlesinger. A new muscle relaxant, miltown, with interesting effects particularly in dyskinesias, is now undergoing tests.

Professor James B. Campbell is carrying on an investigation of the innervation of the musculature of the urinary tract. His method for stereotaxic placement of radioactive isotopes in the brain of laboratory animals for the production of quantitated lesions has been developed over the past three years and has now proven clinically useful for the treatment of Parkinson's disease.

Professor Joseph Ransohoff has been carrying out important electroencephalogram studies and laboratory work at the New York State Psychiatric Institute with Professor Eli S. Goldensohn and Dr. Stanley Lesse of the Department of Neurology. He has been testing the use of certain new drugs on psychiatric patients and has continued his work in psychosurgery at the New York State Psychiatric Institute with Professor Pool. Professor Ransohoff has

continued his radioactive studies, with Dr. Robert Fishman, of cerebrospinal fluid production by means of radioactive tracers in hydrocephalic children. In conjunction with Professor Sidney Carter, studies and treatment of uncontrollable seizures in children and young adults are in progress with the hope of developing and perfecting operative treatment of epilepsy, including hemispherectomy and cortical excision.

Dr. Thomas J. Bridges is studying an injection-type lobotomy for pain at the Francis Delafield Hospital, and is carrying out radiotracer studies of brain tumors. In addition, Dr. Bridges is studying cerebral vasodynamics by a cranial plethysmographic technique.

A new member of our staff, Dr. James W. Correll, is studying the etiology and treatment of peripheral neuritis. Dr. Correll is also participating in an investigation aimed at the chemotherapeutic treatment of malignant brain tumors of glial origin.

Dr. Arthur A. Pava has worked on an extensive survey of the treatment and management of acoustic nerve tumors, in collaboration with Professor Pool.

Dr. Dominick P. Purpura continues his microelectrode investigation concerning the site and mode of action in the brain of new psychotogenic drugs such as reserpine and lysergic acid, and has written and presented several papers on this study.

Dr. A. Yale Gerol has been actively engaged with Professor Campbell in working out details of bladder innervation in the laboratory and is also a coworker in Professor Campbell's project on the creation of predictable radioactive lesions of the brain.

Dr. Edward C. Ryan is at work on a postoperative study of patients who had suffered intracerebral hematomas, while Dr. William B. Kintzing completed a report on the surgical treatment of cysts of the septum pellucidum.

Dr. Sherwood A. Jacobsen has been studying the effect of dextran and other substances on cerebrospinal pressures as related to the alleviation of cerebral edema.

Dr. Hubert L. Rosomoff, now on leave of absence for duty with the United States Naval Medical Corps, has performed outstanding pioneering experimental and clinical work concerning the use of hypothermia for intracranial vascular surgery and has already written and presented several papers on the subject.

Dr. Clark has participated with Professor Pool in stereotaxic procedures in man related to pain relief and the treatment of Parkinson's disease.

Dr. Joseph W. Robertson is participating with Professor Taveras of the Department of Radiology at the Neurological Institute, Dr. Publio S. Silva, and Professor Pool in a study of optimal methods of treating tumors of the pituitary gland.

Dr. Frank M. Hudson has made an extensive survey with Professor Camp-

bell of all craniopharyngioma cases treated at the Neurological Institute during the past twenty years.

DEPARTMENT OF NEUROLOGY

Professor H. Houston Merritt, Executive Officer

The teaching activities of the Department of Neurology were the same as in previous years. The third-year elective course continues to be quite popular. More than thirty students from our school and several from other schools registered for the course in the summer months. For the majority of these students, the course represented their first contact with clinical medicine. In order to give the students a good foundation for their subsequent clinical work, the aid of Professor Robert F. Loeb of the Department of Medicine was solicited. Professor Loeb assigned several members of his staff to assist in the instruction of the students in the fundamentals of history-taking and phyical examination. This experiment was quite successful and it is hoped that it can be continued in subsequent years.

In addition to the instruction of the resident staff at the Neurological Institute in clinical neurology and basic sciences, the department was charged with the training of a number of fellows, many of whom also participated in research projects.

Clinical research projects conducted by members of the resident staff include: a study of encephalitis accompanying infectious mononucleosis by Drs. S. Faith Walsh and Charles Poser, and Professor Sidney Carter; cerebral angiography in children by Dr. Poser and Professor Juan M. Taveras of the Department of Radiology; hydranencephaly by Drs. Poser, Walsh, and Labe Scheinberg; pseudohypoparathyroidism by Dr. Boy Frame and Professor Carter; recurrent polyneuritis by Dr. James Austin; and cerebral tuberculomas by Drs. William Sibley and Joseph O'Brien.

The electrophysiological laboratories at the Neurological Institute under Professor Paul F. A. Hoefer continue to carry a heavy load of routine testing in electroencephalography and electromyography, and a number of residents have taken part in informal instruction in clinical electrophysiology, usually for periods of from three to six months. In addition, a formal course of twelve lectures on electroencephalography, electromyography, chronaxie, and instrumentation was given by Professors Hoefer and Eli S. Goldensohn, Dr. Joseph Moldaver, and Mr. Leonard Zablow. The research projects in the electrophysiological laboratories at the Neurological Institute include: a report on the diagnostic significance of electroencephalographic recording during sleep in 600 patients by Professors Hoefer and Goldensohn and Dr. Lutz Rosenkoetter; clinical electroencephalographic findings in migraine by Professor Hoefer and Dr. Scheinberg; clinical and electroencephalographic review of periodic abnormalties in cases of encephalitis and myoclonus epilepsy

by Professor Hoefer, Dr. Stanley Lesse, and Dr. Austin; review of clinical and electroencephalographic correlation in 1,500 cases of verified brain tumor by Professors Hoefer and Goldensohn and Miss Molly Cox; a study of cortical cell discharges in the cat at rest and in response to seizure stimulation by Dr. Sidney Cohen; the effects of hallucinogenic drugs on various aspects of brain physiology by Professor Goldensohn and Dr. Stanley Ball; the central nervous control of respiratory activity from various mid-brain and diencephalic as well as cortical structures by Professor Goldensohn and Dr. E. Gardner Jacobs; electroencephalographic changes in hypothermia by Professor Goldensohn.

A report on thirty-nine fatal cases of myasthenia gravis has been completed by Professors Hoefer and H. Houston Merritt, Dr. Henry Aranow of the Department of Medicine, and Dr. Lewis P. Rowland. Dr. Aranow and Professor Hoefer are preparing a special report on the effects of alkylphosphate anticholinesterases, especially octamethylphosphoramide (OMPA), in the treatment of myasthenia gravis. Dr. Rowland, Professor Hoefer, and Dr. Aranow are preparing a report on the coincidence of myasthenia gravis and convulsive disorders. Dr. Rowland is preparing a review of the pharmacological and electrophysiological differences of normal and myasthenic muscles.

Professors Carter, Daniel Sciarra, and Melvin Yahr continue their studies of anticonvulsant drugs in the adult epilepsy clinic. Professor Carter, in association with Professor Joseph Ransohoff of the Department of Neurological Surgery, reported to the Association for Research in Nervous and Mental Disease on the effect of removal of one entire cerebral hemisphere from children with infantile hemiplegia and convulsions.

Dr. Robert Fishman is studying the formation of cerebrospinal fluid by using radioisotopes. Dr. Fishman, with Dr. Ransohoff, has also demonstrated that protein enters the lumbar cerebrospinal fluid in larger quantities than in the ventricular fluid.

Professor William F. Caveness, in collaboration with Drs. Jean Davis, James Watson, Zira DeFries, and Melvin Robbins, is continuing the study of convulsive phenomena in childhood and the effects of chemotherapy and psychotherapy on the clinical manifestations. Professor Caveness is also conducting a clinical and electroencephalographic study of veterans of the Korean war with traumatic injuries to the brain.

Dr. Mavis Kaufman is studying the pathology of toxoplasmosis in man with Professors Abner Wolf and David Cowen, and the mechanism of allergic encephalomyelitis in monkeys with Professors Wolf and Elvin A. Kabat. Professors Wolf and Cowen and Dr. Lester M. Geller have continued their studies on the effect of adverse prenatal factors on the development of the fetal nervous system of rodents. Professors Cowen and Wolf have made a study of infantile cerebral atrophies and encephalomalacias in an attempt to uncover some etiological mechanisms. Professor Wolf, with Drs. Harry Seneca and

Mavis Kaufman, has continued the study of trypanosomiasis in the Indian monkey. Dr. Irwin Feigin has completed studies of xanthomatosis of the central nervous system and of the histochemistry of the pathological changes in diffuse sclerosis.

The laboratory of immunochemistry at the Neurological Institute under Professor Kabat has continued studies on the structural basis for the unique biological activity of the blood group A, B and O substances. Professor Kabat and Dr. Sidney Leskowitz have shown that the dialyzable oligosaccharide fraction from mild acid hydrolysis of hog blood group A substance can inhibit precipitation of anti-A by A substance while a similar material from hog O substance had no effect. Of the constituent monosaccharides present in the blood group substances only N-acetylgalactosamine was capable of inhibiting precipitation of A-anti-A and only galactose could inhibit precipitation of the B-anti-B system. Dr. Mary E. Carsten and Professor Kabat have been continuing their studies on the amino acid composition of the hog A and O substances. Mr. Peter Z. Allen, a graduate student in microbiology, and Professor Kabat are studying the specificity of the non-dialyzable material remaining after mild acid hydrolysis of the blood group substances. Studies on the immunochemistry of dextran and other polysaccharides have been continuing. Mr. Allen and Professor Kabat have demonstrated a relationship between the fraction of 1–6 linkages in a series of dextrans and their capacity to precipitate anti-dextran. Purified anti-dextran has been obtained by Professor Kabat and Dr. Carsten, who treated washed dextran anti-dextran precipitates with the enzyme dextranase.

Professor Kabat spent two weeks at the Biochemistry and Virus Laboratory at the University of California at Berkeley, working with Professor Howard K. Schachman. They studied the ultracentrifugal and electrophoretic properties of the purified antibody and also attempted to study the interaction of the purified antibody with a hexasaccharide, isomaltohexatose, which had been prepared by Drs. J. R. Turvey and W. J. Whelan at the University of North Wales.

Dr. Frederic C. McDuffie is studying immunochemical specificity relationships among human antibodies and gamma globulins. Mr. Charles Petersen is continuing the routine determination of gamma globulin in spinal fluid. In addition, he has carried out a limited number of serum gamma globulin determinations in cases of agammaglobulinemia in order to investigate the origin of occasional unusual findings in cerebrospinal fluid gamma globulin. Continuous evaluation and correlation of the spinal fluid gamma globulin data is being carried out by Professor Yahr and Dr. William Sibley in collaboration with Professor Kabat.

Miss Ada E. Bezer and Professor Kabat have also been carrying out a study to determine the lowest molecular weight dextran which is antigenic in humans. A series of dextran fractions of varying but known molecular weights

have been prepared for the National Research Council by Commercial Solvents Corporation and these fractions are being used for this study. This work is of importance for the use of dextran as a plasma expander.

Professors Harry Grundfest and Mario Altamirano and Dr. Chian-Yuan Kao have published a detailed account demonstrating that the resting potential of nerve is not due to a Donnan potential. The studies on electroplaques of the electric eel by Professor Grundfest and his associates have also led to new information about synaptic transmission. Professors Grundfest and Altamirano and Dr. Kao have found three species of knifefishes, related to the electric eel, that possess electric organs and emit continuously short pulses. The frequency of these pulses may be as high as 300 per second and is extremely regular. Control of this pulse emission is in the central nervous system. The role which these signals may play in the economy of the fishes is as yet unknown.

The existence of the distinct dorsal spino-olivary tract found in earlier work has been confirmed in a series of experiments by Professor Grundfest, Dr. Franco DiBiagio, and Dr. Howard Krieger.

Further work on the olivary and cerebellar pathways is being conducted by Professor Grundfest and Dr. Fred A. Walberg. Professor Grundfest and Professors Joseph E. Fiasconaro and Harold Sherman of the Department of Dental and Oral Surgery reported the results of evaluating dental anesthetics by the technique of digital plethysmography. Further studies with this new method are in progress and have demonstrated its usefulness in the rapid evaluation of a new high-potency dental anesthetic.

Dr. Stanley Crain, who previously developed a technique for the microelectrode method for the investigation of nerve cells in tissue culture, has now greatly improved this technique and has been able to grow and make electrical records from cells taken from the spinal cord as well as from the conventional chick dorsal root ganglion preparation. A method of growing tissue cultures in mechanical suspension from a paper frame has also been worked out.

Dr. Yoshigoro Kuroiwa, with Dr. Henry R. Liss, has studied the retrograde degeneration of nerve fibers, and with Dr. Christian A. Hovde of the Department of Anatomy, the possibility of the direct projection of sensory systems upon the striatum. Dr. Hovde has continued his studies of the striatum, especially with regard to the electrophysiologic and the behavioral and metabolic effects of stimulation of this structure as well as the behavioral and metabolic effects of its ablation. He has also embarked upon an examination of the connections of the subthalamic nucleus.

Dr. Liss has made a study of the vascular supply of the base of the brain. He has developed an electrode suitable for chronic implantation in the spinal cord. Mr. Walter Morgan has also perfected an electrode for chronic implantation in muscle.

Dr. Fernando L. Orioli has made a study of ataxia in which it has been shown that cerebellar ataxia is not encountered unless efferent mechanisms of the *brachium conjunctivum* are significantly damaged.

Professor Fred A. Mettler participated in the New York Academy of Medicine's Symposium on the Biological Aspects of Mental Disease and in the Association of American Law Schools' round table on "Intent." He also was the James Arthur lecturer at the Museum of Natural History.

Professor David Nachmansohn and his group continued their studies of the chemical reactions associated with nerve activity and particularly on the role of acetylcholine in the elementary process of conduction. During the last few years studies of the proteins of the acetylcholine system have moved into the the center of interest. The investigations of Professor Irwin B. Wilson on the molecular forces of the active surface of acetylcholinesterase have not only greatly contributed to the understanding of enzymic hydrolysis but have also been of importance for our concepts of the mechanism of nerve impulse conduction. They also resulted in a better understanding of the effects of various important drugs on the nervous system.

Particularly striking was Professor Wilson's success in developing antidotes against the alkyl phosphates—the so-called "nerve gases," such as di-isopropyl-fluorosphosphate (DFP), to which belong many insecticides such as tetra-ethyl pyrophosphate (TEPP). These compounds owe their lethal effect to the inhibition of acetylcholinesterase. Their action was generally considered as completely irreversible. Based on his explanation of the mechanism by which these compounds react with the enzyme protein, Professor Wilson developed increasingly efficient compounds which can reactivate alkylphosphate-inhibited enzyme. The synthesis of the compounds was carried out by Dr. Sara Ginsburg. The most efficient compound synthesized so far is picolinohydroxamic acid. It can reactivate 40 percent of TEPP-inhibited enzyme in one minute and more than 20 percent of DFP-inhibited enzyme in two minutes. Some of the compounds have already proved their value as antidotes in animal experiments.

Professor Wilson also continued his fundamental studies on the mechanism of hydrolysis by acetylcholine. With the help of Dr. Enrico Cabib from Buenos Aires, who worked in our laboratory as Rockefeller Foundation fellow, the entropies and enthalpies of activation of the process were investigated. With acetylcholine as substrate the entropy was found to be favorable.

Studies with the electric organs, which have been used by Professor Nachmansohn for nearly twenty years in his studies on the fundamental mechanism of bioelectric potentials, continue to yield most pertinent information. Advance of our knowledge of the proteins of the acetylcholine system on the one hand and the single electroplax preparation developed by Dr. Altamirano on the other, led to interesting new developments. New correlations between chemical reactions studied in vitro and electrical events recorded on the living

cell were established in this work which was carried out in collaboration with Professor Wilson and Dr. C. W. Coates from the New York Aquarium.

On the basis of previous protein studies with acetylcholinesterase and choline acetylase, an interpretation of the molecular forces responsible has been offered. The data have thrown new light on the mode of action of important drugs such as procaine, curare, decamethonium, prostigmine, etc.

Dr. Max Eisenberg has investigated the mechanism of the first step of acetylation, i.e., the formation of acetyl CoA. He prepared a purified preparation of the acetate-activating enzyme and studied exchange reactions catalyzed by the enzyme with the aid of radioactive phosphorus and carbon compounds.

Dr. Annemarie Weber studied the effect of ATP on actomyosin sols. The interaction of actin and myosin to form a complex is necessary for muscular contraction to take place under physiological conditions. A change in the constitution of the complex might be responsible for relaxation. The problem is of importance for the understanding of the elementary process of contraction. Dr. Weber investigated the type of change produced by ATP. Actomyosin was subjected to ultracentrifugation in presence of ATP; three fractions were separated and their properties investigated. With this procedure Dr. Weber was able to establish that ATP causes a dissociation of the actomyosin.

Professor Nachmansohn delivered lectures in Stockholm, Copenhagen, Goettingen, Munich, and Rome. He attended the First International Neurochemistry Symposium at the Magdalen College in Oxford. The Association of European Chemists honored Professor Nachmansohn by presenting him with the Neuberg Medal for his accomplishments in the field of chemistry.

The papers presented at last year's symposium on ion transport held at the College of Physicians and Surgeons and some additional reviews were published in a book *Ion Transport Across Membranes,* edited by Professor Hans T. Clarke of the Department of Biochemistry and Professor Nachmansohn.

Professor H. Houston Merritt was secretary of the American Neurological Association, senior consultant to the Surgeon General of the United States Navy, member of the Council of the National Institute of Neurological Diseases and Blindness of the United States Public Health Service, consultant to the Chief of the Division of Psychiatry and Neurology of the Veterans Administration, chairman of the Committee on the Nervous System of the National Research Council, chairman of the Medical Professional Advisory Board of the United Cerebral Palsy Associations and chairman of the Fellowship Committees of the National Foundation for Infantile Paralysis and the National Multiple Sclerosis Society.

We announce with deep regret the death on August 17, 1954, of Professor James L. Joughin. Professor Joughin was active in the Department of Neurology for more than twenty years and prior to his retirement in 1948 was chairman of the House Staff Committee of the Neurological Institute.

Professor Theodore J. C. von Storch, director of the Service of Neuropsychiatry at the Montefiore Hospital, resigned on October 1, 1954, to move to Miami, Florida, where he is associated with the new medical school in that city. Dr. Tiffany Lawyer was appointed as Dr. von Storch's successor at the Montefiore Hospital.

DEPARTMENT OF NURSING

Professor Eleanor Lee, Acting Executive Officer

The increased enrollment of degree candidates in the class which entered in September, 1954, is significant. One hundred and seventeen students, or 98 percent, are candidates for both the Bachelor of Science degree in Columbia University and the diploma in nursing from the Presbyterian Hospital. The other three students in this class have completed one year of college and no students were admitted with high school preparation only. Of the total September registration of 344 students, 85 percent are degree candidates and 15 percent are diploma candidates. One third of the diploma candidates completed one year of college before entering the department. It is worthy of note that thirty-five students, or 10 percent, of the present student body have high school preparation only.

Comparative statistics of degree and diploma students from 1940 through 1955 show a definite trend toward the completion of two years of college before entrance. At present one hundred fifty colleges and universities are represented in the student group.

Since September, 1937, a total of 2,048 students have been enrolled in the department and the percentage of total withdrawals is 18.2.

Several new scholarships have been given to the Department of Nursing, which is gratifying since the requests for scholarship aid are increasing. During this year 15 percent of the students enrolled received some financial aid ranging from $640 to $50 per student. In October a gift of $9,600 was received from the Louise and Gustavus Pfeiffer Foundation providing ten full-tuition scholarships of $640 and ten half-tuition scholarships of $320 each. These scholarships will be awarded to members of the classes of 1957 and 1958. Another generous donation of $10,000 established the Vivian Beaumont Allen Scholarship. The first recipient will be a member of the class entering in September, 1955. In addition a new scholarship for a second-year student was given by the Mother's Club of Maxwell Hall in January, 1955, and was awarded to Miss Catherine Panzer, Class of 1956.

The following scholarships were awarded to students this year: Dean Sage Memorial Scholarship providing full tuition and University fees for a degree candidate was awarded to Miss Barbara Hagen, Class of 1957; three scholarships from the Vivian B. Allen Foundation were given to Misses Mary A. Bouton, Annette Ely, and Helen Ellison, Class of 1957; the Florist Telegraph

Delivery Association, Inc., scholarships were awarded to Misses Lois E. Jackman and Margaret Tibbals, Class of 1957; the Jane Craig McAllister Scholarship Fund was used to give financial assistance to six students: Miss Kay Nord, Class of 1955, Misses Dolores Vail, Marjorie Sackman, Janet McIllwain, Elizabeth Taylor, and Marjorie Thorne, Class of 1956. In January the balance in this fund was transferred to a capital account to establish a permament scholarship fund, the income to be used annually to help pay the tuition of a second-year student. A donation was made to this fund in May by the Class of 1956 from the proceeds of the Junior Bazaar.

The Margaret E. Conrad Scholarship was awarded to Miss Barbara L. Fague, Class of 1957. The Mary Sencindiver Specht Scholarship was awarded to Miss Barbara J. Holt. The Columbia University Committee for Community Service has donated funds for scholarships from the proceeds of its Thrift Shop. A committee of students assists in the collection of rummage in Maxwell Hall for the Columbia University Thrift Shop. Four scholarships were awarded from this scholarship fund.

The Helen Young Scholarship has been awarded to Miss Mary D. Marcelon, a member of the Class of 1955. A total of fifteen partial scholarships from the Alumnae Association of the Presbyterian Hospital School of Nursing were awarded. Several other scholarships from outside sources have been earned by students before entrance: the New York State Scholarships, Lersner Scholarships, Russian Student Fund, Incorporated, and the Korean Veterans Bill.

Miss Beatrice Ainslee was appointed instructor in nursing, assigned to evening duty on the medical and surgical services, to replace Miss Jane Bishop, who resigned. Miss Esther M. Glad was appointed instructor in nursing, assigned to the orthopedic service, to replace Miss Margaret MacIntire, who resigned. Miss Estelle M. Guidice was appointed instructor in nursing, assigned to the outpatient nursing service, to replace Miss Elizabeth L. Watling, who resigned.

A new program of senior experience of four weeks on the medical and surgical services was instituted for the Class of 1955. Each senior has had an opportunity to function as a member of the nursing team, to develop beginning managerial skills, to learn new therapies and related nursing care, and to demonstrate ability for leadership. Arrangements have been made for two months of senior experience, on medical and surgical services, for each member of the Class of 1956, beginning next September.

A fifteen-hour course, "Introduction to Public Health," was given to the first-year students during the spring semester. The faculty of the Department of Nursing is indebted to Professors Harold W. Brown, Margaret W. Barnard, and William C. Spring, Jr., of the School of Public Health and Administrative Medicine for their interest and assistance in the further development of the public health content in the basic nursing curriculum.

The second year of research under the grant from the China Medical Board has contributed in large measure to the enrichment of the curriculum in the medical and surgical clinical areas. Following the pilot study conducted on the men's medical service last year, the research subcommittee planned with the head nurses for conferences between the resident doctors and the student nurses on each of three divisions of the women's medical service. This experience increased the student's understanding of the patients and their therapy and developed in the students an appreciation of the role of other professional groups in providing for the total care of the patient. Also, every member of the first-year class was assigned to a period of observation in the admitting emergency clinic. The director of the research study scheduled the students for this experience while on a medical service and for observation in the recovery room while on the surgical service.

The junior class was divided into four groups for a block of ninety semester hours given during the medical and surgical experience in the second year. The role of the nurse as a teacher was given special emphasis in the unit on principles of patient teaching. Presentation of group projects by the students illustrated various aspects of the teaching of patients. Field trips were arranged to study the various community agencies providing facilities for the care of long-term illness, the aging population, and the handicapped.

At the Goldwater Memorial Hospital, Professor David Seegal of the Department of Medicine contributed valuable teaching to this program. Special mention should be made of the panel in rehabilitation at the Institute for the Crippled and Disabled, arranged by Professor Robert C. Darling of the Department of Physical Medicine and Rehabilitation. In the coming year four weeks of clinical experience, instruction, and practice on the orthopedic service has been arranged for every member of the senior class.

The Out-patient Nursing Service completed a most successful year with 104 student nurses making a total of 3,995 visits to 920 patients. Each student had two weeks of experience in visiting patients in their homes. The emphasis is on education rather than service and both the faculty and students consider this experience of great value. A family study was presented by each student at the weekly conference and field trips were arranged to community agencies.

Senior elective experience for the Class of 1955 was arranged for eight students for eight weeks at the Mary Imogene Bassett Hospital in Cooperstown, New York, and for twelve students in the degree section in three groups for eight weeks each with the Visiting Nurse Service of New York.

The high standard of instruction maintained by the faculty of the New York State Psychiatric Institute and their continued close cooperation has been very much appreciated. The senior class of one hundred and ten students assigned in four groups completed the twelve weeks' clinical experience in psychiatric nursing, including 105 hours of instruction and forty-five hours of clinical teaching. Miss Edith E. Morgan discussed the topic of interpersonal

relationships with each of the groups of second-year students and participated in the seminar on evaluation methods.

The Clinical Teaching Committee has made a valuable contribution to the educational program for students in all areas. The emphasis on teaching patients has shown good results in student projects in planning and teaching a mother's class during obstetric nursing experience and in developing the play program in pediatric nursing. The public health aspects of nursing have been stressed in all clinical areas.

The Committee on Tests and Measurements, of which Mrs. Helen C. Delabarre is chairman, sponsored a seminar on March 28, 1955, at which a faculty representative of each unit was present. The aim of the seminar was to present highlights of current procedure in evaluation in the nursing curriculum. A brochure on evaluation policies in current practice is being prepared.

During the past year eighty-six graduates of the Department of Nursing took the New York State Board examinations. The mean score of the average of the grades for the five clinical areas was 91 percent. Four additional graduates passed the examination in other states.

A new classification of affiliating students into three groups has been completed: collegiate nursing programs, diploma schools of nursing with collegiate affiliation, and diploma schools of nursing. This new plan will separate the degree students from the diploma groups and will be in effect in September, 1955.

New affiliations started this year include an obstetric and pediatric nursing affiliation with Alderson Broaddus College School of Nursing in West Virginia and a pediatric nursing affiliation with St. Peter's School of Nursing in New Jersey.

Field work experience to thirteen graduate nurse students from the Division of Nursing Education of Teachers College was arranged. Four weeks of senior experience was arranged for eleven students from the Yale University School of Nursing.

At the National Student Nurses Association Convention held in St. Louis in May in conjunction with the National League for Nursing, the two student delegates were Miss Phoebe Curtis, elected Student Government Association president for 1955–56, and Miss Kathleen Kladivko, Class of 1957 delegate.

The Spring Bazaar sponsored by the Class of 1956 was a most successful affair. Dr. Calvin A. Plimpton, honorary member of the class, was on hand to assist the committee. The proceeds were divided between the Jane Craig McAllister Scholarship Fund and the Anna C. Maxwell Reference Library Fund. The benefit for the station wagon, "Three Class Plays," was arranged by a student committee and the proceeds were deposited in the Department of Nursing Station Wagon Fund.

The Department of Nursing Fund which has been carried on as a sub-

sidiary program of the Bicentennial Fund for the Medical Sciences reached a total of $36,684. This represents 990 gifts, well over 30 percent of the living alumnae. The Helen Young Seminar Room for Nursing in the new library-auditorium building was a special project of the Department of Nursing Fund.

Miss Yvonne Hentsch, director of the Nursing Bureau of the League of Red Cross Societies, completed her year of study on the Anna C. Maxwell Fellowship in January, 1955. Miss Hentsch returned to Geneva, Switzerland.

Professor Mary E. Allanach was on sabbatical leave during the spring semester and visited several obstetric units and community agencies. This opportunity for field observation and study of maternity nursing was much appreciated. Professor Eleanor Lee is a member of the Education Committee of the Visiting Nurse Service of New York.

A postgraduate course in maternity nursing leading to a Master of Science degree or a certificate of proficiency under the Department of Nursing, Faculty of Medicine, in cooperation with Maternity Center Association has been approved. The first group of graduate nurses holding a baccalaureate degree will register in September for courses in the School of Public Health and Administrative Medicine during the first quarter. This joint program will include the facilities of the Department of Obstetrics and Gynecology and the clinical facilities of the Presbyterian Hospital. The faculty will consist of members of the Faculty of Medicine in the Department of Nursing, the Department of Obstetrics and Gynecology, and the School of Public Health and Administrative Medicine, and members of the staff of Maternity Center Association and members of the nursing service staff of the Presbyterian Hospital.

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Professor Howard C. Taylor, Executive Officer

The staff of the Department of Obstetrics and Gynecology has undergone a number of changes during the past year. Dr. Henry Clay Frick joined the department as associate. Dr. Saul Bader became research associate on December 1, 1954, and will be particularly concerned with the problems of spectrophotometry in relation to gynecological neoplasms.

In the affiliated hospitals, Dr. Olaf Juell Severud received the title of associate clinical professor of obstetrics and gynecology on July 1, 1954, at the Mary Imogene Bassett Hospital in Cooperstown, New York, and Dr. Joseph Donnelly became assistant clinical professor of obstetrics and gynecology following his appointment as director of the Margaret Hague Maternity Hospital in Jersey City.

A number of promotions were made in the clinical teaching staff: Drs.

Landrum B. Shettles and C. Paul O'Connell from associate to assistant professors of clinical obstetrics and gynecology, and Dr. James R. Montgomery from associate to assistant clinical professor of obstetrics and gynecology.

During the year, Dr. Samuel A. Cosgrove, for many years the distinguished director of obstetrics at the Margaret Hague Maternity Hospital in Jersey City, retired from his position of clinical professor of obstetrics in the Medical School. Dr. Susan W. Williamson, associate in the department, resigned her position on January 1, 1955, to become professor and head of the Department of Obstetrics and Gynecology at the American University in Beirut, Lebanon. The department is proud of this important appointment for one of its youngest members. Also to be reported is the retirement of Dr. Harback Halsted, clinical professor of obstetrics and gynecology and a member of the Department of Obstetrics and Gynecology for thirty-six years. Dr. Halsted was appointed an instructor in 1919. Two members of the residency staff in obstetrics and gynecology are studying abroad under University fellowships: Dr. Stephen G. Burgess, the Jules S. Bache Fellow, has been working principally at the University Clinic in Vienna, Dr. Mary Jane Gray, the Barnes Foster Fellow, has been spending most of her time during the last year at the Radiumhemmet in Stockholm.

The number of hours available in the curriculum for the teaching of obstetrics and gynecology has remained unchanged, but an effort has been made to make more efficient and somewhat more disciplined the teaching in the fourth year. Problems of continuity of personnel in instruction exist in any clinical department in which the requirements of patient care may make sudden demands upon the time of an instructor. This is particularly true in obstetrics. The changes in the organization of the teaching have been made with the particular purpose of providing for unexpected calls on the teachers.

The teaching staff of the department has for many years been divided into three groups: one assigned to the obstetrical ward, one to the gynecological ward, and one to the Outpatient Department. Each of these groups serves for four months, providing instruction to two student sections, after which the groups rotate to a different assignment. The new arrangement requires that a single teacher or preceptor meet each of the three groups for at least an hour daily, thus providing a responsible personal director for each subgroup of five or six students. Beside that, one clinical instructor is assigned throughout the day to supervise the clinical instruction of students. The plan is so arranged that a minimum of a day and a half is given weekly by each member of the teaching staff.

The clinical work of the department has remained relatively unchanged with regard to the volume of work undertaken. During the year 1954 there were 3,849 deliveries, the largest figure ever reported by the department. The largest increment occurred in the ward group of patients—reassuring in view of the fears that the disappearance of the ward type of patient would

soon require a revolution in teaching methods. The number of gynecologic operations was approximately the same as formerly.

Dr. Anna L. S. Southam continues her general interest in problems of fertility in connection with her direction of the Sterility and Endocrine Clinic of the Vanderbilt Clinic.

Professor Joseph W. Jailer is continuing collaborative work with this department. With a group of research fellows he is attempting to characterize the pathologic physiology in Cushing's syndrome due to adrenal hyperplasia. His group is also working on a recently developed assay method for aldosterone to study the mechanism of edema formation. Further studies concern adrenocorticotrophic hormone, and ACTH tests which utilize the response of the plasma corticoids have been performed in patients with various clinical conditions. Those with Cushing's syndrome and those normally pregnant appear to show a hyper-response to ACTH which cannot be suppressed by the administration of cortisone or metacortin, whereas the normal response is easily suppressed with these steroids. Finally, a study is being made of the human urinary gonadotropins, and results obtained thus far suggest that the biological activity of the gonadotropin found in the nonpregnant state is identical under various clinical conditions.

Endocrinologic studies at a biochemical and physiological level are also being undertaken in the laboratory of Professor Seymour Lieberman. Investigations are being made into the biosynthesis of steroid hormones by means of perfusion of isolated glands, adrenals, ovaries, testes, and placenta with C^{14} labeled materials. This work is being done in collaboration with Mr. Samuel Solomon, Mr. Paul Levitan, and Mrs. Delores DeCordoba. Professor Lieberman's laboratory, with Mr. Levitan, is also actively at work on studies of methods for the synthesis and hydrolysis of steroid glucuronosides; and on the preparation of steroid-protein complexes and the investigation of their chemical, immunological, and biological properties in collaboration with Drs. Bernard F. Erlanger and Sam M. Beiser of the Department of Microbiology and Professor Frederic J. Agate, Jr., of the Department of Anatomy. Also under the direction of Professor Lieberman, Dr. Stanley C. Ulick is making an investigation of the nature of urinary metabolites related to the newly discovered adrenal hormone, aldosterone.

Also in Professor Lieberman's laboratory, research by Dr. Jean-Pierre Rosselet on the steroids in pregnancy is continuing. This involves the nature of the corticoids excreted during pregnancy and the amounts of 17-ketosteroids in the urine.

Dr. Landrum B. Shettles has continued his work on the early human ovum and has published two more contributions to this subject. He is presently working with Dr. Ferdinand H. Flick and Professor Agate in the attempt to develop methods for the measurement of blood flow in the pelvis. A series of observations have been made on the clearance time of radioactive sodium

from the human cervix and techniques are being developed for measuring the rate of heat dissipation from the human uterus as a measure of blood flow.

Professor Albert A. Plentl, in association with members of the resident staff, Drs. Earl D. Neslen, Caroline B. Hunter, and Donald L. Hutchinson, continued studies on water and electrolyte transmission between mother, fetus, and amniotic fluid. Their work has involved the application of the theory of multicompartment systems for which a new approach has been worked out. Mechanical models were constructed for the purpose of studying the feasibility of a number of proposed clinical experiments and to estimate permissible dosage limits for pregnant women at term. Methods were developed whereby the exact transfer rates of traceable elements could be determined despite the inaccessibility of the fetus. By cannulating interplacental blood vessels of Rhesus monkeys, serial samples of fetal blood could be obtained without immediately terminating the pregnancy by Caesarean section. Multiple tracers were injected in the three main compartments and the rate of transfer determined. This work has already given rise to a number of important contributions to the literature.

Professor Plentl is also testing the hematopoetic effects of iron preparations currently in use in our Antepartum Clinic and elsewhere. The purpose is to establish the value of these preparations in the treatment of the "anemias of pregnancy."

Studies of the dilatation of the cervix during labor have been continued by Dr. Emanuel A. Friedman of the resident staff. The method has established certain curves by correlating the duration of labor with the amount of cervical dilatation. Recently there has been devised a mechanical instrument designed to obtain objective "cervimetric" recordings. It has been planned, if possible, to make histochemical studies of the alteration of the cervix during the course of its dilatation. During the year Professor Charles M. Steer published the final report on his studies of the electrical activity of the human uterus in normal and abnormal labor. He has also been working to determine the usefulness of a new product called relaxin and on the relation of blood potassium levels to abnormal labor. He continues his work on the application of pelvimetry to the prediction of the outcome of labor.

The attempt to relate possible A-B-O blood group incompatibility to fetal wastage has resulted in the conclusion that no statistically valid correlation exists between major blood group incompatibility and either repeated abortion or cerebral palsy.

Dr. Salome Gluecksohn-Waelsch has continued her studies on the production of brain abnormalities in mouse embryos by immunological techniques. It has been established that immunization of mothers against brain tissue results in abnormalities of the nervous system in about 10 percent of the embryos. In collaboration with Dr. Helen M. Ranney of the Department of Medicine, Dr. Waelsch has investigated the hereditary transmission of

factors responsible for different hemoglobins in mice. It is hoped that the important fundamental field of research will, at some time, yield results that may explain congenital anomalies as they appear in the human newborn.

With Professor Virginia Apgar of the Department of Anesthesiology, work continues on the condition of the newborn infant, with particular regard to its oxygenation and its subsequent course of development.

The relationship of steroid hormone metabolism and the development of various types of new growth, especially those of the reproductive organs, continues to be an obvious field for research. The center of work in this field is the laboratory of Professor Lieberman. Investigations of the nature and amount of 17-ketosteroids being excreted by cancer patients both spontaneously and under treatment with chorionic gonadotrophin continues as a major activity. An elaboration of that problem is a study of the role of the liver in determining the excretion of steroid metabolites in cancer patients following the administration of exogenous C^{14} labeled steroids. This work under Professor Lieberman's direction is being conducted by Dr. Solomon and Mr. Stanley S. Lerner. Beside the direct clinical studies of the steroids in cancer, the general investigations of steroid hormone biochemistry and physiology being carried on by Professor Lieberman and his group are relevant to the cancer problem.

The program designed to study the cytochemistry and biochemistry of differentiation in gynecologic neoplasms, particularly in the epithelial tumors of the ovary, has continued along the lines described in the two previous years. At the beginning of the study two years ago, some twenty different determinations were selected for investigation. During the last year most of these have been continued, some have been dropped as impractical and a few have been added.

Since the beginning of the study on July 1, 1952, a total of 146 malignant neoplasms have been obtained, consisting of thirty-nine papillary serous tumors of the ovary, twenty-two papillary pseudomucinous ovarian tumors, eighteen endometrial carcinomas, thirty-four cervical epidermoid carcinomas, and thirty-three miscellaneous types. The original grading has been carried out on the basis of routine hematoxylin eosin preparations by Dr. Margaret E. Long and by Professor Taylor. A preliminary part of the work, the basis of a report given to the American Gynecological Society on May 24, 1955, consisted of a study of the consistency of grade in individual tumors.

Cytochemical studies have been carried on, particularly by Dr. Long, which are based upon sections, samples of ascitic fluid, and tissue smears. She has been studying ribonucleic acid, succinoxidase, alkaline phosphatase, glucose, and a number of other substances. The portion of the study already completed concerns the ribonucleic acid of the nucleolus. The study of the desoxyribonucleic acid (DNA) cannot be undertaken by this method and Dr. Saul Bader, a new member of the staff, is undertaking the measurement of this substance by spectrophotometric methods.

The biochemical study of the nucleic acids, in relation to grades of malignancy, is being carried on by Dr. Dudipala V. N. Reddy in a laboratory in the Francis Delafield Hospital. His work has involved the isolation of the nuclei by differential centrifugation and the study of the amounts of each nucleic acid. Enzymatic studies have also been carried out by Dr. Reddy on samples of these tumors.

Within the general program for the study of differentiation of tumors, Dr. Helena DeRoetth is making certain metabolic studies both with and without isotopic materials and is investigating the soluble proteins of tumors. In general, the results show a progressive increase in the rate of oxygen uptake with increasing malignancy, this year's results bearing out in general those obtained in previous years.

A small laboratory has been established under the direction of Dr. Harold M. M. Tovell to study the problems of the heterologous transplantation of human tumors into alien species, namely, into weanling rats and hamsters. Twenty-two gynecological tumors have been transplanted, of which two have shown themselves to be serially transplantable. The preliminary work indicates therefore that possibly 90 percent of human tumors may be transplantable and that 5 to 10 percent may then be serially transplantable.

The problem of decision between radiation and surgical treatment in cancer of the cervix remains a vital one. Efforts to solve this by histological techniques for detecting radio-sensitive cases continues in many institutions throughout the world. The work in this institution is under the clinical direction of Professor Saul B. Gusberg in cooperation with Dr. Long. The method here, in comparison with that elsewhere, is based upon the effect of small preliminary doses of radiation upon the cancer cell, particularly upon the nucleic acid components of the nucleolus. On account of the time required to collect sufficient cases and to observe outcomes, it is evident that this work will require many years to complete.

Clinical and pathological studies of gynecologic cancer continue in many directions. Drs. Flick and Richard S. Banfield, Jr., have reviewed the pathology and end results in cases of granulosa cell tumor and thecoma of the ovary. Dr. James A. Corscaden has completed a revision of his book *Gynecologic Cancer*.

Underlying much clinical research in cancer has been the continued effort to organize clinical cancer therapy more perfectly and to measure its results. Dr. David B. Moore has been very active during the last year in reorganizing the cancer follow-up service in the Presbyterian Hospital and extending this to the cases being treated in the Francis Delafield Hospital. The over-all program, directed toward a development of a therapy which allows radiation and surgery to fill their respective places correctly, continues.

Dr. Lothar Gidro-Frank of the Department of Psychiatry has been studying the emotional factors in patients who complain of pelvic pain without evidence of an organic basis or pathologic lesion. The cases for this study

are seen and classified in a special "pain clinic" conducted by Professor Taylor. Intensive psychiatric interviewing and psychological testing are being carried on by Dr. Gidro-Frank and his associate, Miss Thelma Gordon.

A control group consisting of patients drawn at random from the Antepartum Clinic are being studied. It is hoped eventually that features of the psychiatric interview may be correlated with changes in the pelvic blood flow by means of an instrument being developed by Professor Agate and Dr. Shettles.

After several years of discussion and several months of planning, the first issue of a departmental periodical, "The Sloane Hospital Bulletin," appeared in May of 1955 under the editorship of Professor D. Anthony D'Esopo, Dr. Harold M. M. Tovell, and Dr. Robert E. Hall. The bulletin is intended to report, to alumni of the department and to others interested, the work and some of the opinions of the clinicians and research investigators of the department. It is hoped that this periodical may be a valuable means of keeping contact between the department and those formerly associated with it.

During the last year the outside activities of the staff have been many and varied both in this country and abroad. At least thirty-four publications by members of the department appeared. A number of important offices have been held in the last year by members of the department. Professor Earl T. Engle continues as chairman of the Committee on Steroids and Hormones of the American Medical Association. Professor Stanley M. Bysshe is serving as chairman of the Section on Obstetrics and Gynecology of the New York Academy of Medicine. Professor Taylor completes his term as president of the American Cancer Society in October, 1955.

It may be noted again that the principal problem of this department, as well as that of many of the academic departments of obstetrics and gynecology in the country, is the recruitment of a personnel interested in the academic and investigative aspects of the subject. It may be suggested that the distribution of physicians with these interests throughout the various branches of medicine is not now an even one nor is it in proportion to the present scope, future needs, or future opportunities of the various disciplines.

DEPARTMENT OF OPHTHALMOLOGY

Professor John H. Dunnington, Executive Officer

The teaching program for undergraduate students has undergone no material change during the past year. Resident training has received new impetus from the untiring efforts of Dr. Frank Payne and the splendid cooperation of the members of the Department of Neurology. It is with sincere regret and a sense of great loss that we record the death of Dr. Robert R. Chace, whose lectures to the undergraduate nurses were outstanding for their clarity and interest.

The research activities of the department under the guidance of Professor Ludwig von Sallmann have continued on both basic and clinical problems. The first of his studies was on the responses of intraocular pressure, blood pressure, and cutaneous vessels to electric stimulation in the diencephalon. The results of these investigations, done in collaboration with Dr. Otto Lowenstein, Miss Irene Loewenfeld, Miss Margaret Powers, and Miss Paula Pfaff, revealed that electric stimulation of numerous points in the diencephalon of cats induced variations in intraocular pressure.

Professor von Sallmann has also investigated the effects of adrenergic and ganglionic blocking agents on intraocular and blood pressure. In collaboration with Dr. Burkhard Pillat and Miss Powers, this study showed that ten agents tested—etamon, pendiomide, hexameton, ansolysis, arfonad, banthine, benzodioxan, dibozane, dibenamine, and regitine—lowered the intraocular pressure as well as the blood pressure.

The radiobiological effectiveness of alpha particles, deuterons, and X rays on the rabbit lens epithelium were studied. In collaboration with Dr. Cornelius A. Tobias, Miss Carmen Munoz, and Miss Anne Drungis, bombardment of rabbit eyes with alpha particles or deuterons at different dosage levels and with X ray at comparable dosage levels showed that in order to produce the same amount of damage, an X-ray dose five times that of deuterons or alpha particles is required. Furthermore, this radiation-induced damage demonstrated clearly the high vulnerability of the cells in the germinative zone of the lens. These changes were very similar to the age-induced degenerative ones found in the lens epithelium of rats. Species differences in the radiosensitivity of the lens epithelium has been studied in collaboration with Miss Munoz and Miss Drungis. This investigation showed that the production of cataract by ionizing radiation is extremely difficult in the monkey and to date has been impossible in the dog.

In collaboration with Professor Zacharias Dische, Dr. David H. Rhodes, Dr. John M. Walcott, Miss Mireille Beauchemin, and Mrs. Giverva Zelmenis, studies were continued with a view to developing an accurate method for measuring the absorption of blood from the vitreous. Dr. John M. Walcott conducted clinical and histological studies on animals to determine the mechanism of absorption of experimentally induced hemorrhages. Dr. Rudolph Witmer conducted investigations on local antibody formation in experimental uveitis.

Dr. Anthony Donn has begun a study of the uptake of radiophosphorus in malignant ocular tumors to determine if possible the radioactivity of tumors of various speeds of growth and of varying origin.

Professor George K. Smelser in his studies on exophthalmos, in collaboration with Miss Victoria Ozanics, has attempted to separate the hormones involved in the production of exophthalmos by zonal electrophoresis and has observed the effect of various steroid hormones on experimentally produced exophthalmos. With the assistance of a graduate student, Mr. Gustav Mork,

he demonstrated that marked fat mobilization resulted from the action of ACTH and growth hormone when administered with cortisone.

Professor Smelser's comparative studies of aerial and aquatic corneas were reported before the XVIIth International Congress of Ophthalmology in New York last September. He has begun a study on healing of corneal wounds in an effort to determine the types of cells involved in the reparative process and to evaluate the role of the ground substance in healing.

Professor Zacharias Dische has continued his studies on the chemistry of the polysaccharides attached to fibers of the vitreous. Fractionation and purification of these polysaccharides has been accomplished. He also investigated the effect aging has on the lens proteins in rats. The insoluble protein of the lens increases continuously with age from about 20 percent to about 55 percent of the total proteins. The complex process of albumoid formation is so well integrated and coordinated under normal conditions that the lens retains its transparency. Inasmuch as precipitation of albumoid occurs in cataract, further studies were done to determine the exact chemical changes responsible for the clouding.

Professor Dische also continued his studies on the metabolism and chemical composition of the lens capsule, and with the assistance of Dr. Otto Kleifeld, a visiting scholar, found the proteins of the rabbit lens capsule to contain about 2 percent cystine and no cysteine and about 2.7 percent methionine. The sulphur present was completely accounted for by the two amino acids found in the capsule. Assisted by Dr. Heinz Schumacher, a visiting scholar, Professor Dische fractionated the polysaccharides of the cornea.

Professor Seymour Halbert has investigated antibiotic-producing activities of the ocular bacterial flora. His researches on mixed infections with ocular staphylococci and *Corynebacterium diphtheriae* in guinea pigs showed protective effects by antibiotic producers similar to those found with the gas gangrene organism. Using the precipitin agar technique he studied human sera and gamma globulin in streptococcal disease. Strong evidence has been obtained that some of the antigen-antibody bands found were due to heretofore unrecognized streptococcal antigens or toxins. These observations suggest that these techniques may afford a new approach to the analysis of the pathogenesis of infectious diseases. In conjunction with Professor Beatrice C. Seegal of the Department of Microbiology, Dr. Deborah Locatcher-Khorazo, Dr. Rudolph Witmer, and Professor Smelser, a detailed study of anti-lens antibodies is being carried out.

In the Knapp Memorial Laboratory of Physiological Optics, Dr. Gertrude Rand and Miss M. Catherine Rittler have begun a study in flicker perimetry to ascertain the most favorable conditions and best technique for the clinical application of this method and to compare the results with those obtained with the standard method of perimetry. Dr. Charles J. Campbell and Mr. Newton B. Chin studied changes in the refractive state of the eye under low levels of luminance.

Dr. Lowenstein and Miss Loewenfeld in the laboratory of pupillography have reported the results of their studies on the pathological processes in the second afferent neuron of the pupillary light reflex arc; alternating contraction anisocoria combined with general fatigue and peripheral neuritis in a benign postinfectious disorder of the anterior midbrain; the mechanism of miosis in the Argyll Robertson syndrome and in similar pupillary disorders; and central nervous localization of autonomic symptoms in primary simple glaucoma.

Dr. Andrew de Roetth, Jr., has continued his studies on the metabolism of the ciliary body with particular attention to the role of ascorbic acid.

During the past year the following clinical investigations have been in progress: Professor John H. Dunnington, in collaboration with Dr. Ellen F. Regan, has correlated the experimental findings with clinical observations on ocular wound healing. Professor Algernon B. Reese has completed his study on retrolental fibroplasia, and with the assistance of Dr. George A. Hyman of the Department of Medicine, is investigating the combined use of triethylene melamine and high voltage X ray in retinoblastoma and has begun work on tissue culture of ocular neoplasms. Professor Maynard C. Wheeler, with the assistance of Dr. Philip Knapp, is continuing his work on motor anomalies; Professor Willis S. Knighton, with the aid of Dr. de Roetth, continued his studies on glaucoma, and Professor Raynold N. Berke, his studies on the treatment of blepharoptosis. Dr. Frank D. Carroll is investigating the diseases of the optic nerve, and Dr. Graham Clark, detachment of the retina. Dr. William G. Everett has devised a new apparatus capable of measuring the axial length of an eye within 0.2 mm. and a new operative technique for shortening an eyeball.

Outside activities of the members of the department were numerous and varied and included many important lectureships and other honors. For instance, Professor von Sallmann delivered the Proctor Lecture on "Response of Intraocular Pressure, Blood Pressure and Cutaneous Vessels to Electric Stimulation in the Diencephalon" at the dedication of the laboratories of the Francis I. Proctor Foundation for Research in Ophthalmology of the University of California in October, 1954.

Professor John H. Dunnington received the Howe Medal of Honor from the American Ophthalmological Society for "distinguished service," served as vice president of the XVIIth International Congress of Ophthalmology, as a member of the council of the American Academy of Ophthalmology and Otolaryngology, and as a director of the National Society for the Prevention of Blindness. He was the American guest speaker before the Canadian Ophthalmological Society and was elected an honorary member. He delivered the Bowman Lecture, "Ocular Wound Healing with Particular Reference to the Cataract Incision," before the Ophthalmological Society of the United Kingdom on April 28, 1955.

Professor Algernon B. Reese was elected president of the American Acad-

emy of Ophthalmology and Otolaryngology. He served on the American Board of Ophthalmology; he was editor of the Transactions of the American Ophthalmological Society and assistant editor of the Transactions of the XVIIth International Congress of Ophthalmology. Professor Maynard C. Wheeler continued as secretary-treasurer of the American Ophthalmological Society and was elected chairman of the Eye Section of the New York Academy of Medicine. Professor Raymond L. Pfeiffer received an award of merit from the American Academy of Ophthalmology and Otolaryngology and the honorary degree of Doctor of Science from Wittenberg College. Professor Willis S. Knighton continued as chairman of the Committee on Glaucoma of the National Society for the Prevention of Blindness. Twelve members of the department gave instructional courses at the meeting of the American Academy of Ophthalmology and Otolaryngology in New York, September 19–24, 1954.

DEPARTMENT OF ORTHOPEDIC SURGERY

Professor Alan DeForest Smith, Executive Officer

In addition to instruction of the third- and fourth-year students in fractures, dislocations, diseases, deformities, and neoplasms of the musculo-skeletal system, members of the department have been active in research and clinical investigation in fields related to these subjects.

The use of preserved bone as grafts in various types of orthopedic operations has become more frequent and has assumed a place of major importance. The Bone Bank, which was established in the New York Orthopaedic Hospital, was the first in a civilian hospital in this country. Its activities have grown to such an extent than an expansion of personnel has become necessary. During the past year 344 deposits from several sources were made in the bank and this bone was used in 212 different patients on the Orthopedic Service and was also supplied to the Ear, Nose and Throat, and Plastic Surgery Services.

The procurement of this bone was inadequate until a plan was developed to obtain bone from cadavers. This presented a number of problems in that bone from subjects in the older age group or who had infections or cancer is not acceptable. The difficulty of obtaining the specimens under aseptic precautions was so great that much of the material became contaminated and was discarded.

Dr. C. Andrew Bassett, who organized the Bone Bank, then decided to try sterilizing the bone by means of cathode radiation and a project was set up with the high frequency laboratory of the Massachusetts Institute of Technology for doing this. The bone is packaged in a triple layer of polyethelene, frozen, and shipped to the institute from which it is received within forty-eight hours after having been subjected to 2,000,000 R.E.P. This results in minor changes in the bone matrix by rendering it more brittle, but it is still suitable for use as grafts. Arrangements are being completed for carrying out

this process with the betatron recently installed in the Presbyterian Hospital.

Dr. Bassett presented a thesis on "The Development of Long-Term Mass Tissue Cultures of Norman Human Tendon Cells." By the method which he developed, he is continuing the growth in quantity of several types of human cells, and with Professors Gabriel C. Godman of the Department of Surgery, Karl Meyer of the Department of Biochemistry, and Charles A. Ragan, Jr., of the Department of Medicine, is studying the kind of mucopolysaccharides produced by each type of cell.

Professor Godman has discovered some important facts about the chemistry of dividing cells. This was done by cytophotometric studies according to a method developed in the histochemistry laboratory. He also found a marked augmentation of desoxyribonucleic acid in infected cells in cases of human viral skin papilloma. The cytological characteristics and chemistry of regenerating sarcoblasts at successive stages of their differentiation have been studied. In order to carry on these and other studies it has been necessary to develop several new techniques. Others taking part in these various research projects were Dr. Bassett and Miss Priscilla Goettler of the Department of Orthopedic Surgery; Dr. David P. Bloch, Dr. Arline Deitch, and Mr. Charles C. Morris of the Department of Surgery; Professor Karl Meyer and Dr. Henry Grossfeld of the Department of Medicine. Professor Raffaele Lattes of the Department of Surgery rendered valuable service in an advisory capacity.

Professor C. Zent Garber of the Department of Pathology is developing a valuable and interesting museum of specimens of bone and joint pathology from material from the Orthopaedic Hospital and from bones collected over the years by the Department of Pathology. Professor Garber is making physical-chemical measurements of mixtures of compounds entering into the formation of bone and has obtained titration curves which are significant in adding to our knowledge of the formation and structure of bone salts.

The investigation of the effect of anticoagulant therapy on bone repair is being continued by Professor Frank E. Stinchfield and Dr. Robert Samilson. Professors Melvin Watkins and Everett C. Bragg completed a study of the results of early ambulation after lumbosacral spine fusion operations. It has been the practice during the past few years to get these patients up after two or three weeks instead of six to twelve weeks. The study shows that rather than having any detrimental effect this practice actually has resulted in an appreciably higher number of successes. The saving in time and expense to the patients and the reduction in the number of hospital days is very considerable.

DEPARTMENT OF OTOLARYNGOLOGY

Professor Edmund P. Fowler, Jr., Executive Officer

The department is pleased to announce the promotions of Drs. Franz Altmann and Daniel C. Baker, Jr., to clinical professors of otolaryngology; Drs.

Jules Waltner and George V. Browne to associate professors of clinical otolaryngology; Dr. Herbert Friedman to assistant clinical professor of otolaryngology; Dr. Bela Marquit to associate in otolaryngology. In sorrow we announce the sudden death of Dr. Adolph Zeckel, who had been assigned to us for several years from the Department of Psychiatry for research work in the field of the deaf and hard of hearing.

In an effort to educate the medical profession in what constitutes modern ear, nose, and throat practice and to interest young physicians in this specialty for their lifework, an exhibit illustrating the multiple facets of otolaryngology has been prepared by several members of the staff. This is an outgrowth of a similar exhibit used at the twenty-fifth anniversary of the Medical Center and was shown publicly for the first time at the American Medical Association convention in June, 1955. Most interesting to those who studied it were the facts showing that otolaryngology, like so many other branches of medicine, has profited greatly by the introduction of antibiotics, steroids, and chemotherapy. This is in contrast to the oft-heard and completely erroneous cliché that otolaryngology as a specialty has been contracted by these therapeutic measures. For example, although simple mastoid surgery has decreased markedly, other types of mastoid surgery, which were impossible in the pre-antibiotic phase, have increased in the last twenty years. Noteworthy in the study of hospital statistics is that even at its height, from 1933 to 1938, mastoid surgery constituted less than 10 percent of nose and throat surgery and less than 1 percent of ear, nose, and throat practice. It is hoped that when the contents of this exhibit are known and digested it will do much to put otolaryngology in its proper position in the medical specialties.

New vistas for otology are opened up by Professor Altmann's studies on tympanoplasty for chronic otitis media and on the remarkable hearing improvement obtained by stapes mobilization in a number of cases. Professor DeGraaf Woodman has been able to adapt the fenestration operation for otosclerosis to cases of congenital malformation of the external canal and middle ear. This is depicted in the exhibit under his name along with his monumental work on bilateral abductor paralysis and on laryngeal stenosis. Professor Friedman and Dr. Marquit prepared an exhibit on functional rhinoplasty. Professor Baker featured his work on endoscopy and gastroenterology. The whole department has cooperated in the study and use of the tracheotomy, using the horizontal incision in an orderly operation. The exhibit shows modern electronic and optical methods for operating and recording results as well as a resumé of a modern department of audiology and speech.

The exhibit mentioned above covers a large part of the work being done by various members of the department and summarizes many of the latest papers and publications. In addition it should be mentioned that Professor Altmann has finished his film on embryology of the ear under the auspices of the American Academy of Ophthalmology and Otolaryngology. Along with

Professor Fowler and Professor George S. Smelser of the Department of Anatomy, he is now working on selecting material from the hundreds of drawings used in the animation of the film for the preparation of teaching slides and an atlas.

The basic research activities of the department have been markedly increased during the last year by the work of Dr. Milos Basek, who has been employed full time in research and teaching. With Professor Fowler, he has been continuing the study on hypersensitivities of tissues to infection and allergy from denervation. This is closely connected with observations made of the small blood vessel circulation in the cheek pouch of the hamster, the mesentery of the cat and rabbit, and in the human conjunctiva. Dr. Basek, Professor Fowler, and Professor Altmann have been carrying on an appraisal of the old techniques of stapes mobilization and developing new techniques for the alleviation of deafness.

DEPARTMENT OF PATHOLOGY

Professor Harry P. Smith, Executive Officer

Young physicians who remain year after year in the department do so in pursuit of an academic career in pathology—a field which offers broad opportunities in teaching, research, and laboratory diagnosis of human disease. It is gratifying that certain academic members of the department should gain eminence, to the point of being offered increased responsibilities in other universities. During the past year Professor Joseph E. Flynn tendered his resignation in order to accept a position as professor and head of the Department of Pathology at the University of Missouri. Recently Professor Robert W. Coon accepted a similar position at the University of Vermont. The department and the Medical School as a whole share in the recognition which these two individuals have won through past achievements here and through ability and willingness to assume even greater responsibilities elsewhere.

Other members of the department often decide, after receiving several years of residency training, to enter primarily into the practice of laboratory medicine. A few of them remain in academic circles and manage the clinical laboratories used for the diagnosis of disease and the control of therapy. Most of them, however, leave academic circles but operate clinical laboratories, either in hospitals or under private auspices.

The practice of laboratory medicine has undergone tremendous changes within the past twenty-five years—much greater, indeed, than the changes in most of the clinical specialties. The training programs have necessarily changed also, so as to correspond to new requirements. The changes in question have to do in large part with new developments in various branches of clinical pathology, but particularly in the fields of microbiology, hematology,

and clinical chemistry. One need only mention such things as the creation of blood banks and the testing of pathogenic bacteria recovered from patients to determine their sensitivity to a multitude of new antibiotic drugs.

In large university teaching hospitals, these clinical laboratories are commonly subdivided, and each is placed under the control of specialists who devote themselves to research in these special fields as well as to the performance of tests needed in diagnosis and therapy. In smaller hospitals, on the other hand, and especially in those which are less concerned with teaching and research, the clinical laboratories tend to be consolidated under central management, usually under the management of a pathologist. Such a pathologist should be broadly trained, not only in pathological anatomy but in the various branches of clinical pathology as well. He should have expert knowledge of the significance of the various tests and should be able and willing to serve as a consultant to the clinicians on specific problems of diagnosis and therapy. It is essential that the residency training programs developed for the training of such pathologists should take into account these recent trends in laboratory medicine. It is no longer realistic to provide young pathologists with training in pathologic anatomy alone. They need to be trained in the various branches of clinical pathology also. Some of the smaller hospitals succeed reasonably well in providing their pathology residents with a broad, integrated type of training in all branches of laboratory practice. However, these small hospitals usually suffer from a shortage of personnel and from being somewhat remote from the stimulus of academic centers. The large teaching hospitals, such as ours, have many advantages; nevertheless, the fragmentation of laboratories and their dispersal among many departments create difficulties in the organization of an integrated training program. To some extent these difficulties are now being solved through a system whereby pathology residents are rotated among various laboratories. It has been found that excellent basic training of the men can be secured locally in certain branches of clinical pathology. New plans are now being developed, moreover, which involve utilization of independent hospitals of this general vicinity for the rest of the training. Through these various devices, it would seem possible to give outstanding training to at least a part of the men whose interest lies in the field of laboratory practice. By concentrating on men of great promise, one can do much to supply real leadership in this important field of medical practice.

The research activities of the department have progressed during 1954–1955 in a gratifying manner. Professor Robert W. Coon has continued his studies on the purification of factors involved in the coagulation of blood and on the reaction mechanics of these same factors. His studies on the "accessory factors" of blood coagulation have progressed to the point where they have enabled him to analyze and classify several types of human bleeders whose disorders cannot be interpreted through older methods.

Mr. Richard L. Naeye, a fourth-year medical student, has been a very active

and effective member of the department's coagulation laboratory. He has devised quantitative methods for the analysis of the "accessory factor," which is currently known as the "plasma thromboplastin component." It was known already that the factor is congenitally deficient in a hemophilia-like disease seen occasionally in human patients. Mr. Naeye was able to show that it is also deficient in the plasma of certain patients suffering from liver disease and in patients suffering from a deficiency in vitamin K. This outstanding work of Mr. Naeye received special recognition through conferral of both the Meyerhof and the Borden student prize awards for the year 1954–1955.

Professor Wellington B. Stewart and Dr. Raymond Gambino have continued their studies in the kinetics of iron absorption in dogs. The methods of using two radioactive isotopes of iron simultaneously has been particularly fruitful in studying the distribution of iron in the body, as well as the dynamics of absorption.

Professor Stewart, in collaboration with Dr. Vincent P. Perna has continued his research program on the production of fat deposited in the liver of the rat under conditions of dietary deficiency. The ability of certain amino acids to eliminate this abnormal deposition of fat is currently being investigated.

In the division of neuropathology, Dr. Mavis Kaufman, in conjunction with Professors Abner Wolf and David Cowen, has continued the study on toxoplasmosis in man. Dr. Kaufman has also collaborated with Professor Wolf and with Professor Elvin Kabat of the Department of Microbiology in a study of allergic encephalomyelitis in monkeys. Professors Wolf and Cowen and Dr. Lester Geller have pursued experimental studies on prenatal influences upon the central nervous system of the fetus and its effects upon the infant rodent. Professor Harry Seneca of the Department of Urology has collaborated with Professor Wolf and Dr. Kaufman on a study of trypanosomiasis in the Indian monkey. Professor Irwin Feigin has completed studies on xanthomatosis of the central nervous system and on the histochemistry of the pathological changes in diffuse sclerosis.

The neuropathology laboratory, located at the New York State Psychiatric Institute, has many responsibilities both in postgraduate and residency training and in research. Professor Armando Ferraro of the Department of Psychiatry, who has served as director of this program for many years, retired during the year. He has collaborated with Professor Leon Roisin in an experimental study of allergic encephalomyelitis. They have demonstrated diffuse parenchymatous lesions, as well as circumscribed vascular lesions in their material, along with a certain amount of patchy gliosis.

Professor Roizin has continued his comparative histologic and histometabolic investigation, both on animal material and on material obtained from human patients under treatment by psychosurgery. He has also collaborated with others in making studies of pathological conditions of the nervous system with the aid of the electron microscope.

Professor C. Zent Garber has collaborated with members of the Department

of Orthopedic Surgery, both in teaching and research. He is currently making a study of the radiation necrosis sometimes seen in the femoral head as a result of irradiation of malignant disease within the pelvis. He has also continued his studies on the role of hemorrhage in the production of lesions in bones. His physical-chemical studies on compounds entering into the formation of bone are shedding new light on the formation and structure of bone salt. He has collaborated with others in conducting studies on the effect of anticoagulants on repair of bones.

Research in the division of pediatric pathology has continued under the direction of Professor Dorothy Andersen. She has had the collaboration of Dr. Paul H. Boyer of the Department of Pediatrics in a study of the incidence of diarrheal diseases and diabetes in the families of patients known to have celiac disease. Dr. William A. Blanc has studied a peculiar variety of cirrhosis seen at times in patients with cystic fibrosis of the pancreas. Professor Andersen has continued her studies on glycogen storage diseases, and has collaborated with Dr. William A. Silverman of the Department of Pediatrics in the effects of alevaire on respiratory disease in premature infants.

Professor Theodore F. Zucker of the division of chemical pathology, in collaboration with Dr. Lois M. Zucker, reports additional data of interest resulting from their long-term studies on selective breeding of rats. It has been possible in this way to bring about a startling reduction in susceptibility to endemic lung disease. Their studies in breeding large-size and small-size rats has shown interesting differences in the two strains with regard to physiologic function and the size of various organs. These two investigators have also studied deficiency states, with special reference to the incidence of infectious diseases. They are also showing the relationship between pantothenate deficiency and activity of the adrenal. Their studies are thus introducing functional factors which are commonly ignored, but which can be every bit as important as the virulence of the microorganisms or the production of antibodies in the development of disease states.

Professor Edith Sproul has collaborated with Dr. Silvio Fiala, Mr. Martin Blutinger, and Mrs. Ann Elizabeth Fiala in studies on cytoplasmic particulates of normal and tumor tissue by techniques of high-speed centrifugation and electron microscopy. A histochemical dye, pryonine, was used in the centrifugation procedure in order to relate the basophilia seen in histologic preparations to the microsomal and chromidial fractions. They found that ACTH provokes an increase in cytoplasmic RNA and in the basophilic cromidial system of the adrenal gland, independent of cell division. This is of considerable interest, in view of the known physiological effects of ACTH upon this gland.

These same investigators at the Francis Delafield Hospital also reported studies showing that the carcinogenic agent benzpyrene is bound to the proteins of the RNA-rich chromidial system, rather than to mitochondria. This finding suggests a diversion of protein synthesis from the highly differenti-

ated respiratory mitochondria to the simpler glycolytic system— a possibility which is currently receiving further study by these investigators.

Professor Sproul and Mr. Martin Blutinger are also utilizing histochemical techniques in a study of intercellular cement substance, stromal ground substance, and vascular membranes, in relation to tumor development and particularly to the problems of invasion and spread into vascular channels. Changes suggesting depolymerization or hydrolysis in these areas have been observed in cancer produced in mice through use of methyl-cholanthrene.

Professor Henry S. Simms and Dr. Charles R. Harmison have made an effort to coordinate their findings on lipfanogens with the work of Professor Frank T. Lindgren at the University of California. Professor Lindgren cooperated by sending certain of the serum lipoprotein fractions which had been separated by means of the ultracentrifuge. It was found that the lipfanogens as well as the antilipfanogens are located chiefly in the residue fraction from which the lipoproteins have been largely removed. It thus appears that the fat-deposition, as observed in tissue culture, is not produced by lipoproteins.

Dr. Benjamin N. Berg, working with Professor Simms on the problems of aging in rats, has found that a form of muscular dystrophy is a major contributory factor in the death of old rats. Investigations are under way to determine whether this muscular dystrophy results from a vitamin E deficiency and whether it is amenable to vitamin therapy.

DEPARTMENT OF PEDIATRICS

Professor Rustin McIntosh, Executive Officer

The death of Professor Emeritus Herbert B. Wilcox on January 31 marked the passing of one of the commanding figures of American pediatrics. Succeeding Dr. L. Emmett Holt as executive officer of the department in 1922, he directed the transfer of its activities to the Medical Center here on Washington Heights in 1929. Even after his retirement from teaching in 1936, his interest in the activities of the University remained keen. The department stands forever indebted to him for his contributions and for the spirit of loyalty which he radiated.

Professor Alfred G. Langmann retired at the close of the academic year. Through his direction of the pediatric cardiac clinic, and in a long career of clinical teaching, he has rendered notable service to the general pediatric program.

The problem of staff replacement appears right now to be more difficult than ever before. A pediatrician with good clinical training can earn from two to five or more times as much in practice as in academic employment. Clinical departments in this medical school which are well supplied with laboratory facilities for research can overcome the disadvantage by offering attractive opportunities for investigation. In pediatrics, however, for which

the University has supplied no laboratory space of its own and for which the Presbyterian Hospital has been able to make only temporary and somewhat makeshift additions to the meager facilities originally provided by Babies Hospital, this counterbalance to low salaries is lacking. The situation is serious in that it threatens to upset the proper balance among the clinical services which contribute to the medical educational program.

New appointments include those of Drs. Rose G. Ames, Alexander Blum, Jr., Ruth U. Donovan, Phoebe Hudson, Peter Scaglione, and Virginia Van Geyt; and on the staff of the Mary Imogene Bassett Hospital at Cooperstown, Dr. Joe Hamilton Cannon. There have been no significant changes in the teaching program in the past year.

Investigations under the direct supervision of Professor Hattie E. Alexander continue to explore problems of bacterial genetics, with particular reference to the *Hemophilus* group of organisms. Studies carried out by Professor Stephen Zamenhof, Miss Grace Leidy, and Miss Eros Hahn have thrown new light on the properties of chemical substances which appear to control inherited characteristics of bacteria. In collaboration with Dr. Douglas S. Damrosch, Professor Alexander has continued the investigation of factors which influence the successful treatment of tuberculous meningitis and disseminated tuberculosis. These same workers have taken part in a cooperative study organized under the United States Public Health Service and designed to evaluate the effect of modern antibiotic and biochemical agents in the treatment of the initial infection in tuberculosis of childhood. Drs. Katherine Sprunt and Isabel Morgan Mountain, using knowledge gained in part from studies in bacterial genetics, have succeeded in producing by the application of chemical agents during the growth process a new strain of poliomyelitis virus.

In collaboration with Professor Dorothy H. Andersen, Dr. Paul H. Boyer has explored the family background of patients with celiac disease, in a search for genetic factors. Professor Andersen and Dr. Howard H. Mason have extended their studies of glycogen storage disease by applying new methods of enzyme evaluation. With Dr. William A. Silverman she has made an important study of the effect of pulmonary and bronchial tissues of certain newer therapeutic agents applied in the prevention and treatment of respiratory distress in premature infants.

Professor Paul A. di Sant'Agnese, in collaboration with Professor Zacharias Dische of the Department of Biochemistry, has continued an analysis of the properties of duodenal fluid, a study which it is hoped may throw light on the fundamental defect in congenital fibrocystic disease of the pancreas. With Dr. William A. Blanc of the Department of Pathology, he has carried out an intensive study of the hepatic component of this illness.

Dr. Ruth C. Harris has continued her studies of liver function in early life. Application of chromatographic methods has added to the understanding of certain diseases which involve abnormalities of amino acid metabolism. With

the collaboration of Drs. James R. MacLean and Jerold F. Lucey, she has carried out a fruitful study of the relation of serum bilirubin concentration in premature infants to cerebral injury. Professor Conrad M. Riley, assisted by Dr. Ruth A. Davis, has played a leading part in the analysis of therapeutic data submitted by several university groups in different parts of the country who share an interest in the modern treatment of nephrosis. Since any one hospital or medical center is not likely to assemble in a short space of time sufficient clinical material in nephrosis to permit reliable evaluation of new therapeutic agents as they are made available, the cooperative approach appears promising in this field, and the studies described show promise of providing important guides in the design of effective programs of treatment. The same pair of investigators, carrying the problem to the laboratory and working with experimental animals, have tested out various devices for inducing nephritis and nephrosis in animals, thus laying the ground for a better understanding of the disease in man. In a quite different field, in long-term studies of familial dysautonomia, Professor Riley and a collaborating team of observers have gained a closer understanding of the pathologic physiology of the condition; and at the same time, with broader familiarity, milder and less difficult cases can now be recognized.

Dr. Rose G. Ames has assumed the administrative direction of the collaborative study of fetal injury. Out of these studies has come a wealth of material which lends itself to actuarial analysis leading to more accurate appraisal than has hitherto been available of the chances of fetal integrity, malformation, or mortality in a given pregnancy.

DEPARTMENT OF PHARMACOLOGY

Professor Harry B. van Dyke, Executive Officer

As a result of the resignation of Professor Alfred Gilman, both the department and the College lose one of their outstanding teachers. Professor Gilman has been a member of this department for nearly ten years. On January 1, 1956, Professor Gilman will move to his new position as professor and executive officer of the Department of Pharmacology in the Albert Einstein College of Medicine.

Professor Shinji Itoh of the University of Nagoya joined the department as a fellow of the China Medical Board of New York and will return to Japan late in 1955. Dr. H. Claire Lawler was appointed a research associate in pharmacology. Dr. Frederick G. Hofmann, an associate in the department, has been selected as a Markle Scholar in the medical sciences from July 1, 1955, and will continue as a full-time member of the staff.

The pattern of teaching of the undergraduate medical students has continued to embrace carefully planned laboratory demonstrations in place of a number of the student experiments. The exact balance between the two types

of laboratory instruction still varies from year to year and probably should not be rigidly set. The laboratory demonstrations were given by Professor Gilman, Professor Herbert J. Bartelstone, Dr. Paul Brazeau, and Dr. Hofmann. Teaching was greatly facilitated by the publication of a new edition of *The Pharmacological Basis of Therapeutics* by Professor L. S. Goodman of the University of Utah and Professor Gilman.

Perhaps in pharmacology more than in other basic medical sciences there is a serious dearth of trained teachers and investigators. The training of graduate students modifies the situation provided that candidates with a suitable undergraduate training are available. At present four graduate students are working in the department toward the Ph.D. degree.

Professor Bartelstone and Professor Barnet M. Levy of the Department of Dental and Oral Surgery collaborated in the organization and teaching of a new course, "The Biological Principles of Dentistry," designed for all postgraduate students attending advanced courses in clinical dentistry. The correlation of preclinical disciplines with the principles of clinical dentistry was the objective for which the course was designed.

Professor Harry B. van Dyke, Dr. Karlis Adamsons, Jr., and Mr. Stanford L. Engel made further progress in their studies of the physiology of neurohypophysical hormones. The stability of the hormones at various hydrogen-ion concentrations, at different temperatures, and in body fluids or solutions resembling ultrafiltrates of plasma must be known for determination of the hormones in tissues or body fluids. Studies of stability for this purpose have been completed. Interesting results with respect to hormone distribution in a large desert mammal, the camel, were obtained in collaboration with Dr. K. Schmidt-Nielsen and Dr. B. Schmidt-Nielson of Duke University. The paraventricular nuclei of the Algerian camel contains relatively much more oxytocin than vasopressin. This finding is in marked contrast with those in all other mammals heretofore investigated and supports the suggestion of Olivecrona that, at least in some mammals, the paraventricular nuclei may be important sites of secretion of oxytocin.

Professor Gilman in collaboration with Mr. Alan Koch has been engaged in studies on the renal tubular reabsorption of electrolyte. Dr. Hoffman continued his studies of the conditions under which steroid hormones are produced by the adrenal glands. The cortical hormone produced in the greatest quantities by most mammals studied is hydrocortisone; in the case of the rat, it is corticosterone. An attempt has been made to find the reason for this specific hydroxylation defect by employing quartered rat adrenal glands in vitro and observing the production of Porter-Silber steroids (a measure of the dihydroxy acetonetype side chain) from precursor-steroids such as progesterone and desoxycorticosterone.

Dr. Brazeau made further observations on the transport of hydrogen ions by the kidney during metabolic or respiratory disturbances of the acid-base

balance. He was associated with Professor Gilman and Mr. Koch in a study of the relationship of sodium and potassium excretion by the kidney.

Dr. Adamsons and Mr. Engel collaborated in studies on the production of ascites initiated by Dr. John H. Laragh of the Department of Medicine and Dr. Julius H. Jacobson of the Department of Surgery.

Dr. Lawler undertook extensive studies of methods which could ensure quantitative recovery of antidiuretic hormone from urine. Ion-exchange resins and adsorbents were investigated and it was found that the latter offer the greater promise.

Miss Sarah Henry investigated some of the conditions of survival of the neurohypophysical hormones in the hypothalamus where hormone-formation is to be studied later.

Dr. Itoh has found that hypertrophy of the adrenal cortex occurs in rats with severe diabetes insipidus following destruction of the hypothalamic nuclei secreting antidiuretic hormone.

DEPARTMENT OF PHYSICAL MEDICINE AND REHABILITATION

Professor Robert C. Darling, Executive Officer

There has been a notable increase in public recognition of the need for more persons trained in the various aspects of rehabilitation. The pronouncements on the subject and the expanded program of support by the federal government have done much to publicize this need and to stimulate attempts to meet it. Since fully qualified physicians in the rehabilitation team are especially in demand, a major aim of this department continues to be the training of these medical specialists. Three physicians completed the three-year training program this year and took the qualifying examination of the specialty board.

All undergraduate students receive orientation toward the concepts and some of the techniques in this area. An additional exercise this year dealt with the function of the rehabilitation center and of other community agencies which serve the patients' needs after definitive medical care is completed. An elective clerkship has served those students who have an interest in the field.

The postgraduate course in cerebral palsy was again given twice during the past year. Sixteen lecturers from the medical faculty and fourteen visiting lecturers contributed; nineteen clinical centers in the New York area gave the students a diversity of clinical experience and observation. Students included three physicians, seven physical therapists, four occupational therapists, and one dental hygienist, from widely scattered parts of the United States.

The Institute for the Crippled and Disabled has assumed an increased role

as a teaching and research center, both as an independent organization and in collaboration with several departments of the University. The regular annual conference on rehabilitation in compensation insurance cases was again a well-attended and stimulating day: the depiction of a case history by a stage and screen presentation and an analysis of chronic back disabilities by Professor Edward E. Gordon were among the highlights of the program. The second June Workshop for Rehabilitation Workers was given to twenty-five selected students in many disciplines. This course, jointly sponsored by the College of Physicians and Surgeons, Teachers College, and the Institute for the Crippled and Disabled, and supported by the Office of Vocational Rehabilitation of the United States Department of Health, Education and Welfare, was built on the theme, "The Team Concept in Rehabilitation." The students, organized in teams, participated actively in the evaluation and treatment of patients. The institute this year also conducted a six-month course for rehabilitation-center administrators, also sponsored by the United States Office of Vocational Rehabilitation; Professors William Benham Snow, Robert C. Darling, and Edward E. Gordon contributed medical orientation lectures to the course. Among the research-oriented projects at the institute are a three-year follow-up study, a special vocational project in arthritis, and a cerebral palsy work-classification project.

Professor Darling, in collaboration with Professor Paul A. di Sant'Agnese of the Department of Pediatrics, has completed the research phases of the study of sweat in fibrocystic disease of the pancreas. The tests devised have become useful in the diagnosis and understanding of the disease, especially in its atypical forms.

Dr. Shyh-Jong Yue, with Professor Darling, has carried on the first portion of a study of rest. The effect of various modifications of rest between two bouts of standardized work is being explored among normal subjects. Dr. Yue has published his study of cerebral palsy in multiple births.

Dr. Milos D. Lota, with Professor Darling, studied the effect of mild ultrasound energy on the permeability of the red cell membrane. They found a temporary reversible increase in permeability to potassium which would seem to be related to the mechanical effect on the membrane and not to any generalized temperature effect. Dr. Lota continues to explore the effects of ultrasound in selected clinical conditions and to perfect further a volume plethysmograph for peripheral circulatory measurements.

Professor Gordon continues his study of the energy requirements of crutch gaits in paraplegics.

Professor Darling is chairman of the Committee on Advances in Education of the American Congress of Physical Medicine and Rehabilitation. Professor Snow concluded his term as president of the American Congress of Physical Medicine and Rehabilitation. Professor Morton Hoberman was president of the New York Society of Physical Medicine and Rehabilitation for the past year.

Professor A. David Gurewitsch continues as medical director of Blythedale Hospital in addition to his duties of directing physical medicine and rehabilitation in Neurological Institute. He has introduced a tilt table as an aid to reduce calcium and nitrogen depletion of paralytic immobilizing disabilities and is investigating clinically the motion patterns of trunk muscles in various disabilities.

OCCUPATIONAL THERAPY

A total of seventy-two students were registered for the 1954–1955 academic year, of which forty-eight were in the academic program and twenty-four were receiving clinical experience in affiliated institutions. Four students withdrew during the winter session.

It is encouraging to report that this year for the first time since this curriculum was established, several sources of scholarship aid were made available to our students and approximately 45 percent of the student group benefited. Of the forty-eight registered students, twenty-nine indicated a need for financial assistance and twenty-two of these received it. Eleven agencies granted gifts in amounts ranging from $100 to complete coverage of expenses. Grateful acknowledgement is made to the twelve agencies responsible for this aid.

The Student Council met regularly once a month and worked hard to establish a means of communication between three classes that were never in one location at the same time. In addition, it served as a meeting ground for students and administration to try to work out mutual problems. Under its guidance, the honor system continued to function successfully.

Educational activities directed by the students included two evenings devoted to the showing of some excellent professional films that could not be included in the regular courses of instruction. Thirty to forty students attended each evening. Another activity of interest was the representation of each class on the Student Liaison Committee of the New York Occupational Therapy Association, thereby bringing the students of New York University and Columbia University together and making the student groups aware of professional activities and problems.

Eleven students completed requirements for the Bachelor of Science degree, and thirteen for the certificate. Nineteen members of the class took the Occupational Therapy Registration Examination in February in competition with 251 examinees from other schools. Eleven passed the examination in the top quartile of the examination group, seven completed in the second quartile and one in the third quartile.

Increasing numbers of graduates from this and other schools are looking for opportunities for graduate study. Their desires seem to fall into three main categories: programs for the A.M. degree, short-term specialization courses as exemplified by our offering in cerebral palsy, and refresher work for graduates who have not worked for a number of years and want to be

brought up to date before re-entering the field. A primary requirement, before additional schools of occupational therapy can be set up to meet the ever increasing demands for therapists, is to educate administrators and teachers to staff these schools. Several years ago the National Foundation for Infantile Paralysis established fellowships for the advanced education of occupational therapists for this purpose, and this year three applications were received here from therapists to study at this level. One applicant was accepted and appointed as a fellow for a two-year course of study, which includes academic work leading to an A.M. degree at Teachers College, experience in the clinical instruction of students at affiliated institutions, and experience in school administration and classroom instruction here.

There have been no major curricular changes this year, with the exception of the course in the application of occupational therapy to orthopedics. Miss Marguerite Abbott, who has handled the instruction of the course since the early years of the school, found that she could no longer devote the necessary time and asked to be relieved of laboratory sections. Miss Abbott retained over-all responsibility and a two-hour lecture period each week. We were fortunate to be able to secure the services of Miss Thelma Wellerson to handle the laboratory sections. Miss Wellerson has introduced patient demonstrations as part of the course at the Institute for the Crippled and Disabled; also included are lectures on crutch-walking by Miss Blanche Talmud, and practice in its techniques as well; and instruction from Mr. Charles Goldstine and his staff in the fabrication of functional splints.

The clerkship program continues through the generosity and able instructional supervision offered by the occupational therapy personnel of seven affiliating institutions. In the past few years several other schools of occupational therapy have introduced a similar type of preclinical patient experience into their programs.

Difficulties in scheduling classroom space continue; especially is there a need for space suitable for laboratory work in kinesiology and for seminar groups.

Misses Virginia Kilburn and Abbott and Professor Marie Louise Franciscus attended the first Congress of the World Federation of Occupational Therapists in Edinburgh, Scotland, and the Annual Conference of the American Occupational Therapy Association in Washington, D. C. Miss Kilburn was representative at the midyear education meetings of the American Occupational Therapy Association in Atlanta, Georgia.

PHYSICAL THERAPY

During the academic year a total of forty-eight students were enrolled: twenty-one with advanced standing; eleven as seniors; sixteen as juniors. The seniors completed their final clinical practice in May at the New York State Rehabilitation Hospital, West Haverstraw, New York, and were

awarded their B.S. degrees in June. The students with advanced standing will finish their four months of clinical practice and training in September and will be awarded certificates of proficiency in physical therapy in October. The juniors have been scheduled as previously for a two-month clerkship this summer.

There is a significant increase in the number of students applying for guidance and further information about physical therapy and for scholarship aid. There is a growing awareness of the importance of early preparation for prerequisite education and of early application for admission to the programs of study in physical therapy.

The one-week clinical orientation period which was introduced at the start of the spring session last year was continued this year. This has been well received by students and instructors. A similar program is given the student for his first month of clinical practice in the summer; by so doing, the student has less apprehension and is more secure in attending his first real clinical practice sessions.

The course in rehabilitation at the Institute for the Crippled and Disabled has been broadened by the acquisition of thirty-six pairs of adjustable crutches with tips and a storage cabinet. This will now give all students an opportunity for active participation in crutch adjustment, in the various crutch gaits, falling with crutches, etc.

Numerous requests for placement of graduates, along with other needs for information on alumni of the courses, pointed to the necessity of an up-to-date alumni directory. Since last year marked the tenth year of graduating qualified physical therapists, it seems an especially appropriate time to prepare such a directory. This directory, which will be available soon, assembles all pertinent information about graduates in one book.

DEPARTMENT OF PHYSIOLOGY

Professor Magnus I. Gregersen, Executive Officer

Junior positions on the teaching staff have been filled for the coming year by the appointment of Dr. Ruth Rawson and Dr. Larissa Skvortcov-Lukin as instructors and by the appointment of Dr. Shu Chien, Mr. Leonard Levine, Mrs. Evelyn Fluss, and Miss Barbara Olsen as assistants. Professor Thomas H. Allen returned in October from sabbatical leave which he spent as F.O.A. consultant in physiology to the National Taiwan University Medical College and the National Defense Medical Center in Taipei, Taiwan. Professor Walter S. Root has served as president of the New York State Society for Medical Research, president-elect of the New York Academy of Sciences, and as a member of the Committee on Revision of the Constitution and By-laws of the Society for Experimental Biology and Medicine.

During the past year we have had an opportunity to evaluate further a number of changes in the medical course in physiology. For example, greater use was made of the objective type of examinations. Our experience so far has led to strong divergence of opinion. However, it is generally agreed that the thesis assignment, omitted during the last two years, should be restored.

Several of the graduate courses available for advanced students and research fellows have been consolidated into one course, which will be given jointly by the members of the staff during the fall term. Professor Nicholas Di Salvo, who is in charge of the dental course in physiology, has also participated in several courses for undergraduate and postgraduate dental students, including a new course in clinical-oral physiology, under the direction of Professor L. Laszlo Schwartz of the Department of Dental and Oral Surgery, and a combined basic biological sciences course to postgraduate dental students. Professors Louis Cizek and William Nastuk have continued in charge of the summer courses in physiology.

Professor John L. Nickerson and Dr. James A. L. Mathers of the Department of Medicine have continued their studies on the ballistocardiograph. Professor Shih-Chun Wang, Mr. Edgar Haber, Mr. Kurt Kohn, and Dr. Shih-hsun Ngai and Professor Duncan A. Holaday of the Department of Anesthesiology have successfully recorded the respiratory neuronal activity of the medulla oblongata of cats with a unipolar microelectrode. With the collaboration of Dr. Ngai, the sympathetic blocking property of chlorpromazine has been investigated.

Professor Wang has also been continuing his investigations in collaboration with Dr. Herman I. Chinn of the School of Aviation Medicine, Randolph Field, under contract with the United States Air Force. Professor Wang and Dr. Chinn reported previously that vomiting immediately following total body radiation did not occur in dogs with surgical ablation of the chemoreceptive emetic trigger zone.

Professor William L. Nastuk and Mr. Arthur Glaubach, a first-year medical student, began a search for curariform substances circulating in the blood of patients with myasthenia gravis. This work has been continued and expanded, and at present, the problem of the cause of this disease is being attacked from an entirely fresh point of view with encouraging results. Various aspects of the neuromuscular transmission process in normal muscle were presented by Professor Nastuk at a recent meeting of the Myasthenia Gravis Foundation in Philadelphia. Professor Nastuk and his associates are also making a study of the effect of certain anions, viz., NO_3^- and $SO_4^=$, on the electrical activity of single muscle fibers and on neuromuscular transmission.

Professors Allen and Root have successfully completed their investigations on the colorimetric determination of carbon monoxide in air and in blood with an improved palladium chloride method. Since his return from Taiwan, Professor Allen has completed several papers on the investigations which he directed in Taiwan. These dealt with the relationship of blood volume,

skinfolds, and vital capacity to the size of the body, less its adiposity. Other methods of estimating the so-called "lean body mass" are being investigated by Professor William W. Walcott and Mr. Lewis Arnow, a second-year medical student.

Professor Cizek has continued his long-term observations on the drinking habits of common laboratory animals. Particular attention has been given to the relationship between food and water intake. Professor Di Salvo has continued the study of radioactive phosphorus turnover in teeth of monkeys. He is also pursuing the study of clinical caries in institutionalized children and recently began an investigation of the compressibility and distortion of extracted human teeth, in cooperation wtih the Bell Telephone Laboratories of Summit, New Jersey, and the Columbia School of Engineering. Dr. Ruth Rawson, who joined the department as a research worker during the spring, has been investigating the spectral characteristics of the dye T-1824 in goat plasma and determined the plasma "trapping factor" in the blood of this species. Dr. Rawson has also been engaged in tests on the radioactive chromium method for determination of blood volume.

Various investigations related to the physiological effects of X-irradiation in dogs and monkeys are being carried on. Professor Gregersen and Dr. Charles Pallavicini are continuing a study of the chemistry of brain tissue. One of the by-products of this investigation has been the development of a new micro-method for determining magnesium in tissue samples which eliminates interference from traces of silver and mercury, hitherto troublesome in the analyses. During the summer of 1954, Pier L. Mancusi-Ungaro, then a first-year student, studied the protein content of the brain. Dr. Pallavicini has devised a plan of analysis which now permits reasonably precise estimations of water, lipid, protein, and the principal electrolytes in less than one gram of brain tissue. Earlier studies on dogs given 2,000 to 5,000 r head radiation are being resumed using higher doses (10,000 to 20,000 r). For the sake of comparison, the effects on brain composition of other forms of stress, including extreme water intoxication, acute salt depletion, acute total bleeding, and prolonged water deprivation, have also been studied. In these experiments, the changes in water, sodium, potassium, and chloride in brain tissue have been surprisingly small. Professors Gregersen and Cizek and Dr. Pallavicini, with the assistance of Mrs. Evelyn Fluss and Miss Barbara Zahn, have studied the effects of dietary stress on brain composition in several series of rats. The results are essentially negative so far as evidence for changes in water and lipid content of brain tissue are concerned. Dr. Lukin has completed a study of the effects of X-irradiation on blood volume in splenectomized dogs exposed to 1,000 r total body radiation. A systematic study of the cardiovascular, metabolic, and hematological changes during the terminal stages of acute radiation sickness is being made by Professors Root and Gregersen with the collaborations of Drs. Chien and Lukin, Phyllis Holt, Sheldon Cherry, and Ben Landau.

DEPARTMENT OF PSYCHIATRY

Professor Lawrence C. Kolb, Executive Officer

During the past academic year the faculty of the Department of Psychiatry has welcomed several new members and been saddened by the loss of others who have devotedly given their services over the years. Professor Lawrence C. Kolb joined the faculty at the beginning of the academic year and relieved Professor Irville H. MacKinnon who, with wisdom and loyalty, had guided the activities of the department since the retirement of Professor Nolan D. C. Lewis.

As a means of bringing together the various divisions of the Department of Psychiatry and to improve and integrate the teaching services of the department an executive committee was established in September, 1954. This committee consists of Professors George E. Daniels, William S. Langford, Robert B. McGraw, Irville H. MacKinnon, Sandor Rado, and Lawrence C. Kolb. This committee has met regularly throughout the year and reviewed in turn the staff and clinic appointments, the residency training program, the various clinical facilities available for teaching activities, and the present activities, programs, and recurrent instruction in child psychiatry. As a means of studying the present teaching activities of the department, a number of active staff committees have been established.

Professor MacKinnon, with Professor Paul Hoch, William A. Horowitz, Aaron Karush, and Bruce Buchenholz, and Associate Dean James E. McCormack have met from time to time to study and suggest revisions of the curricula of the postgraduate courses in psychiatry and the residency training program.

Professor Horwitz, with Professor Phillip Polatin, and Drs. Exie Welsch, Charles Hogan, and William A. Brooks, have studied the undergraduate curriculum and are to present a report recommending various modifications in this teaching program.

Professors Rado, Abram Kardiner, Daniels, Nathan Ackerman, and Henriette R. Klein have functioned as an executive committee for the Psychoanalytic Clinic for Training and Research. During the year they have reviewed the schedule of instruction for the Psychoanalytic Clinic with the hope of bringing about a better integration with the residency training program and modifying the hours of clinical instruction so that the clinical services of the New York State Psychiatric Institute might function more efficiently without interference from the courses of instruction.

The staff of the department met as a group on February 4, 1955. At this time it was advised of the establishment of the above committees and of the functions of the various divisions of the department by their respective directors. The staff was advised of a recent survey of the total educational program of the department by Professor Kolb, who expressed his appreciation

of the splendid teaching being performed and the contribution that was being made by all members. This survey indicates that the department is presently responsible for the instruction of 901 students per annum. The burden of instruction goes far beyond that of the undergraduate medical student.

A report was provided on another questionnaire survey of the entering undergraduate medical class of 1954 to determine their prior preparation in psychology and the social sciences. This survey was undertaken as a background for consideration of the instruction during the first and second years. It was found that twenty-nine of the entering students had no training whatsoever in psychology or the social sciences; twenty-three had only an introductory course of one to two semesters; twenty-nine had one or two semesters in sociology or anthropology; forty-six had two semesters in psychology; while nine had extensive training in these subjects. While this study confirms Associate Dean Severinghaus' findings in his "Preparation for Medical Education in the Liberal Arts College" that a greater concern with the social sciences is evident among the students interested in medicine at this time, it is still apparent that the preparatory courses provided by the Department of Psychiatry during the first and second years are necessary and, in fact, perhaps require expansion.

The department notes with regret the retirement of Professor Armando Ferraro after twenty-eight years of service. The department was grieved over the untimely death of Dr. Adolf Zeckel, who had given his services so freely over many years, particularly in collaboration with the Department of Otolaryngology. With regret, but with pride, the resignations are noted of Dr. Sol W. Ginsburg, who joins the faculty of the Albert Einstein Medical School as clinical professor of psychiatry, Dr. Bernard C. Glueck, Jr., who will became associate professor of psychiatry at the University of Minnesota; and Dr. Paul G. Ecker who assumed the post of assistant professor of psychiatry at the University of Pennsylvania Medical School. Zygmunt A. L. Piotrowski resigned to accept a position in research psychology at the New Jersey Neuropsychiatric Institute.

In the Presbyterian Hospital psychiatric teaching has been formalized under the newly established psychiatric service. The nucleus of instructors for this service are those who have taught psychosomatic medicine with Professor Daniels under the Department of Medicine.

Dr. Joseph Lubart has been working in the Thyroid Clinic with Professor Sidney Werner of the Department of Medicine. There he has been holding consultations with patients with nontoxic nodular goiter and following some with brief psychotherapy. Dr. Lubart is investigating conflict configurations and patterns of emotional dyscontrol in these cases. This project was begun several months ago and will be continued until enough patients have been studied to provide material for a report of results.

Dr. John O'Connor has reviewed the hospital records of all patients with

lupus erythematosus and has followed all those admitted to the hospital wards in an attempt to evaluate cortisone psychosis occurrence and possible predisposing factors in these patients. He has also been setting up a more formal evaluation sheet for toxic psychoses, specifically cortisone psychosis. This is being done with the cooperation of Miss Kay Ritchie, a second-year medical student, and Professor Joseph Zubin. In addition to the above, Dr. O'Connor has been evaluating the use of thorazine for this same group of cases and, if possible, for the relief of agitation of hyperthyroidism.

Professor Aaron Karush and Dr. O'Connor continue to see patients in the Combined Ulcerative Colitis Clinic with Professor Charles A. Flood and Dr. Michael J. Lepore of the Department of Medicine, Dr. John F. Prudden of the Department of Surgery, and Dr. Robert Senescu. From the data obtained, the group is attempting to study the natural history of the disease, as well as to compare patients treated medically, surgically, and psychiatrically.

Dr. John A. Cook conducted a series of interviews with candidates for surgery one day preoperatively with a view to determining what major sources of anxiety were related to their previous life history. He also made a preliminary study of patients who had undergone partial gastrectomy for peptic ulcer in order that he may compare the progress of those who were emotionally disturbed to those who presented little evidence of such disturbance as recorded by the surgeons.

Dr. Leon Moses is continuing his psychoanalytic and ballistocardiographic studies of patients with sustained and transient hypertension. He is also working in collaboration with Dr. Edmund N. Goodman of the Department of Surgery on the problem of instrumentation for a long-range psychoanalytic and physiologic study of a case of duodenal ulcer.

In the Vanderbilt Clinic instruction of the medical students continues under Professor McGraw and his staff of associates. It is expected that the resident staff will participate in the activities of the clinic during the forthcoming year. Dr. William A. Brooks has actively participated in the instruction of the first-year medical students, and with the staff of the Montefiore Headache Clinic, he is also investigating the unconscious conflicts motivating tension in migraine headaches in children and adults. Dr. Roy D. Craig is studying the use of pagitane hydrochloride as an adjunct in the treatment of alcoholism and has planned some work on myotonia congenita.

Dr. Robert J. Mearin is evaluating the benefits of adjunctive therapy (pentothal narcosis, carbon dioxide, and thorazine) in conjunction with group psychotherapy. He is to participate in surveys to consider the operation of psychiatric units in general hospitals.

Dr. Hugh Mullan was elected president-elect of the American Group Psychotherapy Association, and continues his study of and work with group psychotherapy. Dr. Frederick M. Weissman, with Dr. Moses J. Madonick, has completed an investigation of the cerebrospinal fluid protein in the aged who are free of neurological disease.

Professor William S. Langford was chosen president-elect of the American Academy of Child Psychiatry and continued as treasurer of the American Orthopsychiatric Association. With Professor Hilde Bruch, Drs. Rodman Gilder, Jr., and Harlow D. Dunton, Professor Langford has studied and presented to the executive committee of the department an analysis of the clinics and teaching facilities available for child psychiatry, with recommendations for their future development. This report has already borne fruit as Professor Bruch has reorganized the inpatient child psychiatric service of the Psychiatric Institute and has provided, with Drs. Dunton and Gilder, biweekly rounds as well as individual supervision of the therapy of the child patients. It is hoped that this important area of instruction will be further broadened by the development of an outpatient department in the Psychiatric Institute for the care of emotionally disturbed children not presently continued in treatment under the pediatric-psychiatric clinic of the Babies Hospital.

The Psychoanalytic Clinic for Training and Research, first training center in psychoanalytic medicine to operate within the framework of a university medical school, held a two-day decennial celebration on March 19 and 20, 1955, which was attended by approximately 750 people. The program was enthusiastically received and aroused so much interest that it is planned to prepare a volume containing the papers which were presented. Professor Henriette R. Klein reviewed the establishment, growth, and development of the Clinic and provided a summary of the careers of the sixty-eight students who had received their certificate of training in the seven years since the first class completed its work. At present 75 percent hold academic positions, 20 percent are engaged in teaching and supervision of resident psychiatrists in state hospitals, and 25 percent have left the metropolitan area and are scattered throughout the various states. Two have earned their Doctor of Medical Science degree from Columbia University. Of those in academic life, just short of 50 percent are of professorial rank and two are executive officers in departments of psychiatry in outstanding medical schools outside New York. Virtually all are engaged in investigative work either as part of their academic responsibilities or in conjunction with their activities in some affiliated hospital.

At the New York State Psychatric Institute graduate instruction has been modified during the year in a number of ways. Professor Heinrich Waelsch, with Professors Hoch, Carney Landis, and I. Herbert Scheinberg, organized and were responsible for a series of evening seminars in which presentations were offered monthly by a member of the staff and one of the resident psychiatrists. The Friday clinical conferences have been reorganized so that they are held during morning hours when fuller participation is obtained by the faculty of the various divisions.

Professor Franz J. Kallmann and his associates have continued their studies in genetics. With Dr. Egill Jensen and Bernard Roth, particular emphasis

is focused on the genetic aspects of preadolescent schizophrenia. Variations in adjustment to aging and longevity is under study with Dr. Bertha M. Aschner; special and familial forms of mental deficiency, with Dr. Gordon Allen and George S. Baroff, for the Bureau of Socio-environmental Studies of the National Institute of Mental Health; and, personality development in the presence of early deafness, with Dr. Edna S. Levine and John D. Rainer. Other departmental studies dealt with the distribution of handedness in families, by Mr. Arthur Falek, and with early detection and management of Huntington's chorea, by Dr. Walter Haberlandt.

Professor Warren M. Sperry and Drs. Herbert L. Meltzer and Benjamin Weiss have continued their studies of lipid metabolism in the central nervous system and have demonstrated that the brain lipids are rapidly labeled when the monkey brain is perfused in the living animal with 1-C^{14}-acetate or 1-C^{14}-octanoate. They have applied methods of solvent fractionation, chromatography, and counter-current separation to such labeled lipids in attempts to isolate individual lipids and to determine the sites of labeling. Professor Sperry has developed methods for the determination of total lipids in brain tissue and in blood serum, and he has investigated conditions for the saponification of brain lipids.

Professor Heinrich Waelsch and his associates have continued their study of the metabolism of amino acids, particularly in the nervous system. The enzymatic mechanism of histidine metabolism as a donor of one carbon unit was investigated with soluble enzyme systems. With Dr. Abel L. Lajtha, the role of the blood-brain barrier in uptake by and release from the brain of amino acids was investigated as well as the turnover of brain proteins. With Dr. Howard Sachs the enzymatic conversions of thioesters of glutamic acid were studied. Dr. Harold J. Strecker investigated the mechanism of the enzmye conversion of proline to glutamic acid. Professor Waelsch is a member of the Organizing Committee of the International Neurochemical Symposia and is acting as editor of the Proceedings of the First International Neurochemical Symposium held in Oxford during the summer of 1954.

Research by Professor Nicholas Kopeloff and Dr. Lenore M. Kopeloff has been concerned primarily with experimental epilepsy in the rhesus monkey, which is produced by injection of alumina cream intracerebrally or after topical application to a principal cerebral sensorimotor cortex. Recently, multiple injections into a parietal lobe were found to induce chronic epilepsy, which was not prevented by ablation of ipsilateral precentral motor cortex, suggesting a role for the parietal lobe of the monkey in motor activity. The effects of occlusion of major cerebral arterial vessels on the behavior, electroencephalogram, and convulsive seizure patterns of epileptic monkeys is being investigated in collaboration with Dr. Joseph G. Chusid of St. Vincent's Hospital, New York City.

A study of the influence of various drugs upon the experimentally induced

chronic seizure state is in progress. The influence on this convulsive disorder of thorazine and various other drugs, including adrenergic, cholinergic, and steroid substances, is being studied. In collaboration with Professor Waelsch the effects of a variety of chemical agents are being investigated in epileptic monkeys. A joint project with Professor William F. Caveness and Dr. Jean P. Davis of the Department of Neurology and Dr. van Wagenen of Yale University is being conducted on the maturation of seizure patterns in monkeys from early infancy through various age levels.

Professor Leon Roizin, in collaboration with Professor Dan H. Moore of the Department of Microbiology and Dr. H. Ruska of the United States Public Health Service is studying nerve cells and glia elements in normal and pathologic conditions of men and animals with the electron microscope. In addition, they are examining the processes of degeneration and regeneration of muscle and myoneural junctions. With Professor MacKinnon and Dr. Reginald Taylor, Professor Roizin is conducting experiments to determine the chronic pathological changes that occur as the result of prolonged administration of isonicotinic acid hydrazide.

Professor Landis and his associates are attempting to establish psychophysical indices of organic brain damage. A second project, under the direction of Professor Joseph Zubin, has as its aim the development of a series of psychological tests, which if administered at the time of first admission to a mental hospital will afford some degree of prognosis of outcome, particularly when the psychiatric diagnosis is schizophrenia.

Professor Hoch, with Professor James P. Cattell and Drs. Harry Pennes and Sidney Malitz, continued his investigations on the clinical effects of delta-lysergic acid diethylamide and mescaline and various other purported hallucinogenic agents. They have found that the induced psychopathologic effects of such drugs may be blocked variably with chlorpromazine, pervitin, sodium amytal, and reserpine. Other newly developed hallucinogenic and antihallucinogenic agents are under study. With the Department of Neurological Surgery, Professor Hoch and his associates continued their investigations of the therapeutic effectiveness of various selective circumscribed cerebral ablations upon certain psychotic and psychoneurotic conditions.

SCHOOL OF PUBLIC HEALTH

Professor Harold W. Brown, Associate Dean and Director

During the 1954–1955 academic year, the student body of the School of Public Health consisted of ninety-six full-time, and thirty part-time, students. There were twenty-three foreign students from seventeen different countries. In addition to the extensive program of instruction in the School of Public Health, the faculty continued its teaching program for the medical, dental, and nursing students.

Faculty changes during the year included the following: Dr. Harry S. Mustard, who had formerly served as director of the School and DeLamar professor of public health practice, and more recently as professor of public health practice, retired at the end of the current academic year and has been designated professor emeritus of public health practice; Dr. Robert L. Vought, associate professor of epidemiology, resigned to take an important position in the medical research department of a pharmaceutical firm.

The following new appointments were made to the teaching staff of the School of Public Health: Dr. Clement C. Clay, associate professor of administrative medicine; Dr. Magda P. Shorney, instructor in administrative medicine. Dr. Basil C. MacLean, commissioner of hospitals of the City of New York, was appointed associate professor of hospital administration. The following members of the Presbyterian Hospital staff were appointed to lectureships in hospital administration in the School of Public Health: Mr. Alvin J. Binkert, vice-president and general manager; Miss Anna E. Grosso, chief pharmacist; Mr. Richard N. Kerst, assistant vice-president and assistant treasurer; Dr. Joseph E. Snyder, assistant vice-president; and Mr. Dale K. Tuller, assistant vice-president. Dr. Randolph A. Wyman, medical superintendent of Bellevue Hospital was also appointed a lecturer in hospital administration. Dr. Beatrice Mintz was appointed assistant professor of occupational medicine and Dr. Morris Kleinfeld, chief, Medical Unit, Division of Industrial Hygiene of the New York State Department of Labor, was appointed a lecturer in occupational medicine.

Through funds supplied by the United States Public Health Service, a teaching program in mental health has been developed and Dr. Mottram P. Torre was appointed associate in psychiatry and assigned to the School of Public Health.

Past achievements in the field of public health have led to great sanitary improvements and the control of most of the communicable diseases. Public health programs and training for public health careers are, therefore, undergoing considerable reorientation. The public, now protected against many diseases, is seeking means of obtaining adequate medical care, especially for the chronic diseases and the diseases of the aged. In order to study the best methods of providing and paying for medical care, the School of Public Health developed, over the past five years, a research and teaching program in administrative medicine, and for the past three years this work has been centered in an Institute of Administrative Medicine within the School of Public Health.

A two-week orientation course in public health was held in September for foreign students of this and other schools of public health. The general aspects of public health were considered in an attempt to give the students a familiarity with the vocabulary of public health and a general orientation in the field. Inasmuch as the subject of statistics is often quite difficult for foreign students with a language handicap, special emphasis was placed upon it. Students

sponsored by various governmental agencies and the Rockefeller Foundation reported to their sponsors that the course was most useful and should be repeated each year.

All students in hospital administration spend a calendar year as administrative residents in a hospital and are under the direct supervision and guidance of the hospital administrator who serves as their preceptor. In order to develop closer integration of the academic studies and the practical work in the administrative residency, a three-day institute for the hospital administration preceptors was held. The faculty of the School of Public Health, the preceptors, and the students who had recently returned to school from their administrative residencies participated in an analysis of the present teaching program and recommendations for its improvement.

The Presbyterian Hospital and the other affiliated units of the Medical Center have extended their facilities to us and have been most cooperative in assisting the School in its teaching program for hospital administrators and public health workers. The Washington Heights District Health Center of the New York City Department of Health, under the direction of Professor Michael Antell, has also rendered invaluable service; Commissioner of Health Leona Baumgartner and her staff, in the central headquarters of the New York City Department of Health, have continued to aid our teaching program.

The faculty of the School of Public Health continued to sponsor a series of forums which are open to all of the students of the School and to the Medical Center community. A number of outstanding lecturers in the field of medical care and public health participated in the teaching program of the School as guest lecturers.

A new lecture and seminar course was developed and participated in by all of the students and the faculty of the School. Important areas of public health and medical care were assigned to a faculty member and a group of students who made a presentation of each topic before the whole student body. These sessions proved to be stimulating and considerable discussion was developed.

The faculty of the School of Public Health continued its wide participation in local, state, federal, and international health programs. They took part in a large number of community and scientific meetings throughout the United States and in foreign countries as well. Their researches resulted in the publication of twenty-four articles on various phases of public health.

ADMINISTRATIVE MEDICINE

In the past three years, slow but continuous progress has been made in the administrative medicine program. Hospital administration is one of the cornerstones of administrative medicine and first efforts were, therefore, made in the direction of improving, strengthening, and consolidating our educational program in this field. The course in hospital administration extends for

an academic year in university residence and a calendar year in administrative residency in an approved hospital. Two years ago, it was decided that the year of administrative residency was not fulfilling its academic potentialities, inasmuch as it followed the academic year in residence and the students therefore did not have the advantage of complete integration of the two sections of the course. In order to integrate fully the studies at the University with the hospital experience, four months are now spent in academic residence, followed by a twelve months' hospital residency, which, in turn, is followed by the final four months of academic study. This new arrangement has proven invaluable and the participation by the students in seminars on the return from their hospital residencies has led to most gratifying results.

With the curriculum in hospital administration on a firm foundation, the present year has been devoted to the development of academic work in the several other phases of administrative medicine. The several fields in administrative medicine require special academic backgrounds and interests on the part of the students and each program for them in the School of Public Health is designed individually to suit their special needs. Thus, curricula have been designed for students who are interested in the field of medical prepayment, occupational medicine, and Blue Cross administration.

Because the field of administrative medicine is relatively new, there is no well-defined and organized body of knowledge for use in teaching. One of the important functions of our faculty in administrative medicine will be researches to give the answers to a number of problems in administrative medicine which, in turn, will be of value in our teaching program.

In the past several years, the faculty of the School of Public Health participated in a number of studies and services in the broad field of administrative medicine and the contributions which it has made are of considerable significance.

During the past year, the School made a study of the effectiveness of the Rochester Regional Hospital Council for the Commonwealth Fund which has been supporting this interesting experiment in regional medicine. This work has been completed and will soon be published. It will be the first comprehensive survey of regionalization in hospital and medical care. This study was under the general direction of Professor E. Dwight Barnett, with Professor Henry B. Makover and Dr. Leonard S. Rosenfeld as co-directors.

Recently a group of prominent citizens in New Brunswick, New Jersey, became very much interested in the medical and public health facilities available in their area and the direction that their development and expansion should take. Through the Institute of Administrative Medicine, a survey was made for the group with recommendations for future expansion and improvement.

With the development of extensive health and preventive medical services in industry through prepayment programs, there has been great interest in assessing the effectiveness of the programs. Professor Leonard J. Goldwater,

who has been associated with this movement for a number of years, initiated, with the Hotel Trades Council and Hotel Association Health Center, a survey of the effectiveness of the health program and reasons for incomplete utilization of the services.

The above studies have afforded the faculty of the School of Public Health practical experience in the organization and administration of varied types of health programs. In every instance students in hospital administration or in administrative medicine were associated with the studies to some degree. Thus, these studies and researches have served as teaching material and as they are published they will continue to be a source of case study material.

BIOSTATISTICS

The teaching activities of the division for students in the School of Public Health were similar to those of previous years. Teaching of statistics to the medical students, however, was slightly changed and for the first time a series of lectures was given to the first-year students. Formerly these lectures were given to the third-year medical students but from the experience of the past year, it is evident that the material is better acceped by the first-year students and will serve them as a working tool during the remainder of their medical course. The division has continued to give frequent consultation to the research workers of the Medical Center.

Dr. John E. Silson is actively participating in a study conducted by the Army on the value of gamma globulin used prophylactically and therapeutically against respiratory disease among recruits.

Professor John W. Fertig has continued his close cooperation with the Family Health Maintenance Demonstration at Montefiore Hospital; with the New York City Health Department in its development of statistical projects; with the Sidney Hillman Health Center in its study of arteriosclerosis. He also serves as a member of the Advisory Committee on the Fluoridation of Water Supplies of the New York State Department of Health. Professor Fertig spent the summer at the School of Public Health in Santiago, Chile, where he lectured and conducted seminars in biostatistics in connection with the training program of the Pan American Sanitary Bureau.

EPIDEMIOLOGY

The division has continued to carry on its extensive teaching in the School.

The hypertension research project, carried on in cooperation with the Bureau of Applied Social Research and financed by the Commonwealth of Massachusetts, has continued. A series of papers on critical appraisals of the literature and two papers on field studies in this subject have been completed.

The analysis of the data on untreated syphilis in Norway was completed this year and the final reports will be published during the coming year.

Mrs. Anna C. Gelman and Professor E. Gurney Clark are collaborating with Dr. Adele C. Shepard, venereal disease control officer of New Jersey, in a study of the premarital blood test laws in New Jersey.

Mrs. Gelman is collaborating with Professor Alvin R. Jacobson in a study of the bactericidal effect of the small concentrations of fluorides added to water supplies for the prevention of dental caries.

Mrs. Gelman visited the Communicable Disease Center in Atlanta, Georgia, to observe the activities of the epidemiology, visual aid, training, and laboratory branches. She is also participating actively in the organization of the Alumni Association of the School of Public Health, especially in planning the directory of all former students.

OCCUPATIONAL MEDICINE

During the current year, six Master of Public Health candidates majored in the field of occupational medicine, four of whom were physicians from foreign countries who are being trained for important positions in their governmental services. Excellent arrangements for field work were made possible through close affiliation with the Division of Industrial Hygiene of the New York State Department of Labor. The director of the division, Professor Irving R. Tabershaw, and the chief of his medical unit, Dr. Morris Kleinfeld, rendered invaluable service in assisting with our teaching program.

Studies of the effects of employment on the course of heart disease were continued, supported by a grant from the National Heart Institute of the United States Public Health Service. Studies on the evaluation of preventive health services in industry in collaboration with the Institute of Administrative Medicine were continued.

A clinical and environmental study of mercury exposure in one of the laboratories of the Columbia University School of Mines was carried out in collaboration with the Division of Industrial Hygiene of the New York State Department of Labor.

PARASITOLOGY

The teaching program in parasitic diseases was expanded during the year and material on parasitic diseases was included for the first time in the epidemiology and the microbiologic laboratory course required of all Master of Public Health candidates. An elective course in tropical medicine, which includes clinical work in the New York City Department of Health Tropical Disease Service and special diagnostic laboratory studies, was developed and it appears to meet the needs of the foreign students. The current clinical and laboratory diagnostic methods as well as therapy are stressed. Professor Howard B. Shookhoff, and his staff have been of great assistance in this course and have continued to cooperate in instruction for medical students and special students.

The Division of Parasitology has continued to arrange special work in tropical medicine for medical students, and this year the third team of fourth-year medical students spent their senior elective period in the Aluminum Mining Company hospital in Dutch Guiana. In addition to their clinical experience, they tested the effectiveness of piperazine in human ascariasis and collected blood specimens from the aborigines for Dr. Helen M. Ranney of the Deparment of Medicine, and Professor Claus W. Jungeblut of the Department of Microbiology, which was used in their blood grouping and virus research.

The division arranged special work in tropical medicine and parasitology for missionary physicians, nurses, and technicians who are preparing for service in tropical areas.

Professors Harold W. Brown and Kathleen L. Hussey and Dr. Kam-Fai Chan have continued their studies on the chemotherapy of helminth infections. They have tested extensive series of new chemicals, supplied by several pharmaceutical companies, in experimentally infected animals. Extensive laboratory and clinical studies have established the value of piperazine in enterobiasis and ascariasis in man, and piperazine-citrate has become the drug of choice for both of these infections. Studies are also being made on the site and mode of action of the piperazines on parasitic worms. A grant from the United States Public Health Service has enabled the group to initiate studies on the biology of the pinworm and the host-parasite relationships. Several graduate students are supported by these funds.

Professor Roger W. Williams has continued his studies on the filth flies and haemophagous *Culicoides*. During the summer of 1954, he investigated these diptera at the University of Michigan Biological Station. He is spending the summer of 1955 at the Bermuda Biological Station and is conducting biological studies on blood-sucking arthropods of the area.

Professors Brown and Hussey and Dr. Chan have continued to assist the administration of the North Jersey Training School in the control of amebiasis and enterobiasis among the inmates of the institution.

Professor Brown is serving on the Board of the New York State Medical Examiners. Professor Brown and Professor Emeritus Bion R. East made a survey of physician and dentist manpower for the government of Puerto Rico and, as a result, a dental school will be developed in conjunction with their new medical school which Columbia University helped to organize.

PUBLIC HEALTH EDUCATION

The teaching in the Division of Public Health Education was reorganized during the 1954–1955 academic year owing to the discontinuance of the curriculum leading to the Master of Science degree in public health education. Five students with special interest in health education were admitted for the Master of Public Health curriculum.

Professor George Rosen has been appointed a member of the New York School Health Survey Advisory Committee, which is surveying the school health services of the city.

PUBLIC HEALTH PRACTICE

The reorganization of the public health practice courses discussed in the past two annual reports has now largely been completed. The method of presentation of the principles of public health practice has been altered, decreasing the previous sole dependence on lectures while increasing the use of the case method with problems provided for solution by the students, individually and in groups. Student interest in the subject has been noticeably improved and it is evident that basic understanding of the material has been considerably increased.

This year, for the first time, Master of Public Health students were taken in small groups on a three-day field trip to a local health unit. Observational experience of this type was welcomed by the students and was especially useful in orienting foreign students to public health in the United States.

Professor William C. Spring, Jr., completed his consultant assignment to the Medical Services Task Force of the Commission on Organization of the Executive Branch of the Government, in which he served as staff director for the Public Health Division of the Task Force in addition to undertaking specific studies related to the practice of preventive medicine in federal medical care programs.

Professor Spring has begun preliminary activities related to an extensive study of school health services in New York City. He will serve as principal investigator of this project. He has extended his relationship with the Welfare and Health Council of New York City by serving as chairman of its Health Division and secretary of its Central Planning Board.

Professor Margaret W. Barnard has continued as chairman of the Committee on Local Health Councils of the National Health Council.

SANITARY SCIENCE

Professor Alvin R. Jacobson, in cooperation with Mrs. Gelman of the Division of Epidemiology, has continued the study of the bactericidal effect of the small concentration of fluorides added to water supplies for the prevention of dental caries.

Professor Jacobson, upon his return from a study tour of Latin America, wrote a comprehensive report summarizing his observations and impressions of public health and sanitation conditions in Chile, Brazil, Argentina, Trinidad, and El Salvador. Included in this report were recommendations for improvements in training of students from Latin America. Professor Jacobson has made several revisions in the courses in sanitary science as a result of his

Latin American trip. The principal changes have been a shift in emphasis in certain courses reflecting the importance of basic sanitation in the present and future development of public health in the homelands of the foreign students.

DEPARTMENT OF RADIOLOGY

Professor Harold W. Jacox, Acting Executive Officer

Pending the appointment of a new executive officer to replace Professor Ross Golden who retired after thirty-two years on the faculty, the department continues to operate at a high level without any radical changes in staff or physical facilities. Professor Harold W. Jacox was appointed acting executive officer of the department and acting director of the Radiological Service in Presbyterian Hospital for 1954–1955.

Professor Jacox became president of the New York Roentgen Society for 1954–1955. He continues as co-editor with Professor Morton M. Kligerman of the Radiation Therapy Section of the *Year Book of Radiology*. He was appointed a member of the Committee on Radiological Health in the Radiological Society of the State of New York.

As usual, a number of changes in the professional staff have occurred since the last report. Professor John Caffey's appointment was changed from professor of clinical pediatrics to professor of radiology, effective July 1, 1954. Assistant professors Josephine S. Wells, Juan M. Taveras, and Russell Wigh were promoted to associate professors effective July 1, 1954.

Drs. Meyer Alpert of Spring Valley, New York, and J. Luther Jarvis of Mars Hill, North Carolina, joined the staff as instructors in radiology. Drs. Kent Ellis, Joseph M. Moynahan, Jerome Nadelhaft, and Norah duV. Tapley, former residents here, were also appointed instructors.

Professor Caffey reports that the principal investigation in pediatric radiology is the continuing one of the study of the neonatal pelvis and the acetabular angles in relation to the pathogenesis of congenital dysplasia and congenital dislocation of the hips. The material has stimulated observations on normal variations in the growing pelvis. Dr. Steven Ross is concluding a report on the normal ischiopubic synchondrosis which demonstrates that swelling, irregular mineralization, and even progressive demineralization of this structure in some cases develop in healthy children. Dr. Samuel Madell is studying some interesting variations in the mineralization of the normal pubic bones which may simulate fractures during the first months of life. It is also now evident that the pelvic bones present changes in mongoloids which it is believed will prove valuable in the recognition of mongolism at the early ages when it is most difficult to identify conclusively. Drs. Ellis and Nadelhaft are studying the roentgen appearance of the infant heart and lungs during the first few days of life with emphasis upon the normal and its variations, in preparation for publication. Professors Wigh and Caffey are collaborating in the use and

development of angiocardiography as both a research tool and procedure for patient care.

Professor Wigh in association with Dr. Philip Johnson is continuing a study of the effect of scleroderma on the colon; studies of extraluminal soft-tissue shadows associated with carcinoma of the esophagus, in collaboration with Dr. Ezekiel Freed; studies on the characteristics of metastatic cancer of the large bowel in association with Dr. Tapley; and studies concerning the depth of the retropharyngeal space secondary to lateral displacement of the trachea and larynx.

The members of the Department of Radiology are cooperating with Dr. Edmund N. Goodman of the Department of Surgery and his associates in electrogastrographic work. This research project will evaluate the capacity of electrogastrographic tracings to detect gastric cancer and their usefulness in assisting in the differential diagnosis between gastric lesions of indeterminate etiology uncovered by radiologic means.

Professor Gerhart S. Schwarz is making a statistical analysis correlating roentgen cephalopelvimetry to actual obstetrical outcome. Based on the same material, another analysis is being made to correlate the roentgen diagnosis of disproportion with the clinical diagnosis in order to evaluate the usefulness of either procedure objectively. Also, he has developed a new method for obtaining roentgen measurements of transverse pelvic dimensions with an accuracy of 0.5 mm. or better, which has been named orthometric radiography.

Dr. Robert Hochstim is making a research study of normal intervertebral discs on post-mortem subjects for the purpose of developing the technique of discograms in collaboration with Dr. David Hayes and Professor Everett C. Bragg of the Department of Orthopedic Surgery. A study of aortograms on dogs is being done by the members of the department in conjunction with the group in experimental surgery to study aortic nylon grafts. A study is also being made of the collateral circulation of animals for the purpose of determining whether the collateral circulation disappears after the original obstruction has been removed. Dr. Ralph Schlaeger is making a study on the evaluation of intravenous cholecystocholangiography in infants and children.

Professor Kligerman and Professor Virginia Kneeland Frantz of the Department of Surgery are continuing research on a study of carcinogenesis in the thyroid of the Long-Evans rat from external and internal radiation. Professor Kligerman in conjunction with Dr. Daniel Shapiro of the Department of Surgery is conducting an experiment on the effect of radiation and cytotoxins on tumors in mice.

Professor Kligerman and Professor Arnold Kremen gave a series of lectures on cancer of the breast under the auspices of the North Dakota Cancer Society in March. In April, Professors Kligerman and Quimby gave a refresher course on rotation therapy at the Inter-American Congress of Radiology held for the first time in Washington, D.C.

Professors Wells and Wigh have redistributed the teaching assignments to

include all members of the department. Two extra hours of lectures in radiotherapy have been added to the third-year teaching program. The teaching file of X-ray films has been revised and augmented. Professor Wells is serving as a representative of the department on the cardiovascular teaching committee, which is preparing a booklet for medical students to be published in the near future.

Professor Juan M. Taveras is working with Professors Edward B. Schlesinger, Harald H. Rossi, and Quimby on the development of improved techniques in radioactive isotopic localization of brain tumors. With Dr. Francis M. Cummins, Professor Taveras is reviewing 1,500 cerebral angiograms to determine the incidence and significance of junction dilatation of the posterior communicating artery with the internal carotid artery because of its great importance in the surgical management of intracranial aneurysms. With Dr. Catherine J. Dalton, he is working on the myelographic aspects of venous and arteriovenous malformations of the spinal cord.

The work of the Radiological Research Laboratory has continued along the lines described in previous reports. There are two separate activities: the research project for the Atomic Energy Commission, and problems allied with therapeutic radiology and with medical uses of radioactive isotopes.

The research work carried out in the laboratory under the Atomic Energy project is directed towards the study of problems of special interest to the commission. The annual report on this work, consisting of 176 pages, has been submitted to the Commission and will be published in the next few months. The work consists of two main categories and some of the results in each are summarized briefly below.

A number of calibrations involving tissue equivalent ionization chambers have been performed, including a comparison with a different type of neutron dosimeter. Experimental measurements of the LET (linear energy transfer) distribution of three neutron sources have been carried out and the results compared with theory. In addition, further work on the characteristics of the LET measuring device was performed.

A special ionization chamber has been constructed for the separate assessment of various radiations incident upon borated tissue.

Beta-ray dosimetry utilizing chambers and internal gas multiplication is being explored as a specific example of the general application of dosimetry at collecting voltages in excess of saturation.

Data have been obtained on radiation-induced leakage in the dielectric of ionization chambers having small volumes.

Improvement in source preparation technique makes possible the use of the symmetrical electrodes 2π counter with lower energy beta-emitting radioisotopes by reducing self-absorption. P-32 disintegration-rate comparison with Argonne National Laboratories gave satisfactory agreement.

Further experiments on the determination of "W" have been carried out. The stopping power, relative to air, of several gases has been calculated from

Bethe-Bloch theory and the results are in very close agreement with the experimental values of Hersh reported last year.

A new method of determining the number of disintegrations per second for K capture isotopes is described. It has been tested with the gamma rays of Au-198.

A comparative study of the early cytological radiation effects on the lens epithelium of mice, rats, rabbits, dogs, cats, and rhesus monkeys has been undertaken. Some results suggest an association between the proliferative activity of the lens epithelium in individual species and its radiosensitivity. In conjunction with this study, the influence of X-radiation on the composition and metabolism of the lens capsule and the lens itself is being investigated.

A study of post-irradiation protection of rabbits by injection of "splenic" plasma is described. The splenic plasma is plasma derived from blood taken directly from the splenic circulation of normal rabbits. Injection of this plasma into irradiated rabbits appears to influence favorably their survival in comparison with that of control rabbits receiving total body irradiation only.

The inactivating effects of X- and ultra-violet radiations on bacteriophage T_1 appear to be independent when the two types of radiation are administered consecutively. Similarly, the effects of heat and ultraviolet are found to be independent when administered consecutively but only if the phage is in aqueous suspension during treatments. If the phage is exposed to ultra-violet (UV) in the dry state, and consequently heated while still dry or in aqueous suspension, its sensitivity to heat is increased.

Exposure of *E. coli* B or B/R to a wavelength band from 3200 Å to 4600 Å produces a very slow reduction in colony formation but a much more rapid reduction in the ability to produce phage T_1. T_1 phage surviving UV radiation is also not reproduced by previously illuminated bacteria. Work is in progress to determine whether the effects of the illumination can be reversed.

Experimental data have been obtained which indicate that the mere attainment of a plateau on a saturation curve is not sufficient proof that all the ions produced in an ionization chamber are being collected. This may help explain energy dependence of "W" for alpha particles.

Investigation of the tissue dose produced by radioisotopes when highly localized in small regions by means of "wall-less" ionization chambers has continued. Some difficulties encountered in this work are described and the design of a new ionization chamber to aid in this investigation is outlined.

Depth dose determinations have been made on several plane, thin sources of beta-ray emitters of uniform surface density. The results of calibration of many commercial survey instruments using these determinations are given.

A method for simulating X-ray depth dose curves by light absorption and scattering in a water suspension of gum gamboge and a dye is described.

It has been found that individual depth dose curves can be reproduced accurately enough for practical purposes.

Studies on the relation of sex, estrus cycle, and hydration to radiosensitivity in the mouse show that female mice are more resistant than males to an LD/50/30 day exposure to X rays, and females in estrus are about twice as radiosensitive as those in diestrus.

The protection of fetuses from normally lethal doses of radiation by injection of cysteinamine into the pregnant mouse is reported.

Observations of the effect of radiation on the eyes of fetuses X-rayed on gestation day 12.5 or 13.5 indicate that the fetal eye exhibits remarkable powers of repair and regeneration aided by the radioresistant primitive neurectoderm.

An instrument which is being developed for automatic blood counting is described.

Physical aspects of radiotherapy problems have received a great deal of attention. The betatron has been installed in the remodelled building, south of the basement corridor between the Babies Hospital and the east wing of Presbyterian Hospital. Planning of the radiation protection for this building, and of the very flexible treatment table, has been carried out by Professor Gioacchino Failla. Professor Rossi has planned the auxiliary laboratories and equipment.

Because of the new problems arising with the use of this new equipment, Professor Rossi has been transferred from full time in radiological research to half time there and half time in radiotherapy. Two members have been added to the physics staff, with responsibility mainly to clinical uses of radiation: Mr. Francis DeFriess as hospital physicist and Miss Ginette Jacob as physics assistant.

Professor Quimby has continued to work on studies of dosage problems in radiation therapy, in cooperation with the therapeutic radiologists.

Professor Failla has continued to be active in work with the Atomic Energy Commission and other government agencies, both civilian and military, on problems related to atomic energy. He is chairman of the Advisory Committee for Biology and Medicine of the Atomic Energy Commission, and consultant to several of the Atomic Energy Commission installations. He is chairman of the radiation instrument panel of the Armed Forces Special Weapons Project; chairman of the Visiting Committee for the Medical Department of the Brookhaven National Laboratory. Professor Failla is also a member of the International Commission on Radiological Units, the International Commission on Radiological Protection, the National Committee on Radiation Protection, and chairman of corresponding subcommittees of the two protection organizations.

Professor Quimby is a member of the Advisory Committee on Isotope Dis-

tribution of the Atomic Energy Commission, of the National Committee on Radiation Protection, and of the subcommittee on Handling and Disposal of Radioactive Isotopes of the International Commission on Radiological Protection. Professor Rossi is chairman of the subcommittee on "Neutrons" of the National Committee on Radiation Protection.

Professors Failla and Quimby continue to be members of the subcommittee on graduate instruction for work in biophysics. Several courses have been offered particularly for students in this field by Professors Failla, Quimby, Rossi, and Roberts Rugh. Professor Quimby has also given regularly scheduled courses in radiologic physics and in medical and biological uses of radioactive isotopes. Professor Quimby has been promoted to the rank of full professor and Assistant Professor Rossi was made an associate professor.

Investigation of certain aspects of the radiographic differentiations of retroperitoneal abdominal tumors from hepatomegaly is being conducted by Dr. Rose Louie and Dr. Jose Guzman. The presence or absence of duodenal displacement has been used as a point of value in the differentiation of retroperitoneal tumors from simple hepatomegaly. Considerable evidence collected here suggests that this point of differentiation may not be of any considerable value.

The investigation into the radiographic appearance of post-radiation fibrosis of the lung has been begun by Dr. Doris Bate. The frequency, time of appearance, radiographic characteristics, differential diagnosis, and duration of significant pulmonary fibrosis following postoperative radiation in breast carcinoma is of considerable importance.

Investigation of the radiographic usefulness and toxicity of larger than average doses of cholografin in intravenous cholangiography is proceeding with the assistance of Dr. Charles E. Crandall, Jr., of the Department of Medicine. The visualization of usual doses frequently has been unsatisfactory. Superior visualization was obtained when the dose was increased to 120 cc.

Professor Bachman reports additional studies on the radiography of the larynx and hypopharynx. Certain functional studies of the swallowing phenomenon have been carried out with the aid of the Fairchild camera. This has been correlated with cases of hypopharyngeal tumors. Other aspects of cervical radiography are also being studied. Codification of interesting material continues. Routine X-ray-pathology conferences at weekly intervals are also being continued. Weekly X-ray-surgical and X-ray-medical conferences are being conducted. These afford excellent opportunity for correlation of the interesting current cases for the mutual advantage of the several departments and the instruction of residents and students.

Messrs. Carl B. Braestrup and Richard T. Mooney are working on the problem of attenuation of scattered cobalt 60 radiation and dose determinations in the irradiation of the esophagus. A study of brain tumor localization is being carried on by Dr. S. Allan Lough and Dr. Thomas J. Bridges of the Department of Neurological Surgery.

Attempts were made in the Radiotherapy Department of the Francis Delafield Hospital to standardize the tumor dosage needed clinically to restrain the growth of various regional cancers by the use of 2 MeV X-rays and cobalt 60 radiation. Inherent radiosensitivity characteristic of the cancer under treatment, its superficial extent and invasiveness, as well as regional lymph node involvement, are the chief factors which influence the outcome of supervoltage radiotherapy, just as with more conventional irradiation. Tumor doses of 5000–6000 r in five to six weeks have been followed by growth restraint in a few deep-seated cancers of limited extent, not usually controlled by less penetrating irradiation, but also by failure of the treatment in many other more extensive cancers. The irradiated normal tissues seem to tolerate these high tumor doses better when given with supervoltage than with conventional X-rays. Thus, some cancers of the base of the tongue, maxillary antrum, cancer of the larynx with fixed vocal cords, cancer of the breast with internal mammary node metastases, recurring multiple papillary carcinomas of the urinary bladder, and some cancers of the cervix uteri have been arrested.

Of fourteen carcinomas of the lung thus treated and examined post mortem by Professor Sproul, three failed to show any evidence of persisting cancer in the treated area. Marked palliation of cough, reduction of expectoration, bleeding, and pain and perhaps some prolongation of life was obtained in the majority of 100 carcinomas of the lung investigated by Professor Guttmann.

A special study was made of cancer of the esophagus by Professor Lenz and Dr. Thomas O'Grady. Review of the literature and of forty personal cases treated on the 2 MeV and cobalt 60 equipment suggests that cancer of the esophagus primarily spreads in a vertical direction along the submucosal lymphatics, and is often much more extensive than it would appear from esophagoscopy or X-ray examination. Metastasis to lymph nodes draining the primary site is the rule, especially in locally invasive and extensive cases. Cancer of the cervical esophagus in most instances metastasizes to intrathoracic lymph nodes and in only a small percentage to cervical lymph nodes. Those arising in the thoracic esophagus involve not only peri-esophageal and broncho-tracheal lymph nodes, but in a goodly percentage also the sub-diaphragmatic lymph nodes. Diagnosis is usually made only after silent involvement of these various lymph nodes has already taken place. Thus, any improvement in treatment of the primary tumor in the esophagus by surgery or radiotherapy is not likely materially to change the poor survival statistics after these purely local methods of treatment. Radical excision or irradiation of all lymph node involvement is practical only if this involvement is of limited extent, i.e., when the primary lesion is small and superficial and has as yet not given rise to extensive, inaccessible, and clinically unrecognizable regional lymph node metastases. Improvement of local surgery or radiotherapy is therefore less likely to increase survival than earlier diagnosis. This may be facilitated by the more general and earlier use of biopsy via the esophagoscope and of X-ray study of the mucosal pattern of the esophagus, whenever there is

the slightest suspicion of esophageal cancer. The tendency to silent vertical extension and regional lymph node involvement should be taken into consideration in planning either surgery or radiotherapy in the individual patient.

Members of the department delivered numerous guest lectures throughout the country, contributed numerous articles to scientific journals, and wrote chapters in several textbooks.

DEPARTMENT OF SURGERY

Professor George H. Humphreys II, Executive Officer

The department has maintained a balance in its teaching, research, and clinical functions at the high level of previous years. Changes in staff have been few.

On November 1, 1954, Dr. Louis Bauman died. He established and headed the laboratory of chemistry which, with those of pathology and bacteriology, were established by Professor Emeritus Allen O. Whipple as a fundamental development within the department to bridge the gap between the basic medical sciences and the clinical practice of surgery. A memorial fund for the support of further research in surgical problems has been established in his name by his friends and colleagues.

On July 1, 1954, Professor Jerome P. Webster retired. His development of the departmental program in plastic surgery also had its origin in Professor Whipple's vision, and his contributions to his specialty, to the University, and to the department have been of the highest order. In addition to his extraordinary clinical contributions, Professor Webster's great interest in medical history has resulted in the establishment of a magnificent library of plastic surgery, which he has presented to the University. Among numerous honors he has been decorated by the governments of England, France, China, and Greece. As professor emeritus and consultant in the Presbyterian Hospital he remains active in practice. He has been succeeded in the directorship of the division he founded by Professor Thomas W. Stevenson, who was the first resident he trained.

Also this year, on March 31, Miss Florence Harvey retired. As a social service worker, Miss Harvey was not strictly a member of the department, but her direct relationship to its clinical work over twenty-eight years of service has been so intimate that the teaching value of her services to generations of students and house officers will be sorely missed.

On July 1, 1954, Dr. Arnold Kremen was appointed professor of clinical surgery and attending surgeon in the Presbyterian and Francis Delafield Hospitals. Professor Kremen came to us from Minneapolis where he had been associate professor in the University of Minnesota. With special interest

and skill in the surgery of neoplastic diseases, particularly those of the head and neck, Professor Kremen was appointed to fill the position as chief of the surgical service of the Francis Delafield Hospital.

On July 1, 1954, Dr. John F. Prudden returned from military service and on December 6, 1954, Dr. George Crikelair returned. Our third staff member to return from military leave is Dr. Charles W. Findlay, Jr., who rejoined the staff on February 1, 1955. Three members of the department were granted sabbatical leaves from July 1, 1954, to December 31, 1954.

Professor George H. Humphreys visited sixteen universities and thirty-five teaching hospitals in Scotland, England, Sweden, Denmark, France, Switzerland, Italy, Lebanon, Syria, and Iraq. This afforded a unique opportunity not only to study the organization of hospital teaching services of a wide variety, but also to discuss mutual problems with other professors of surgery, and to observe technical advances and research interests in many fields. In Edinburgh, London, Copenhagen, Turin, and Beirut, it was gratifying to meet men trained in the department who are now well established and doing credit to their American training.

On the occasion of his sabbatical leave, Professor Raffaele Lattes accepted a Fulbright Senior Lectureship and was assigned to the University of Turin Medical School in Italy, where he gave a postgraduate course on the surgical pathology of tumors from October 1, 1954, to December 15, 1954. Before going to Italy, Professor Lattes visited the diagnostic and scientific laboratories of the Department of Pathology at the Royal Cancer Hospital in London, the University of Leeds, and the Radium Hemmet in Stockholm.

During the absence of Professors Humphreys and Lattes, Professor Lawrence W. Sloan was in charge of the Department of Surgery and the Surgical Service, and Professor Virginia Kneeland Frantz was in charge of surgical pathology.

Professor Margaret R. Murray served during July as associate director of the Cooperstown course in the principles and techniques of tissue culture, given at the Mary Imogene Bassett Hospital. This course, given annually, is attended by a select group of postdoctoral students with research interests. In August and September she visited laboratories engaged in tissue culture research in Amsterdam, Copenhagen, Stockholm, London, Oxford, Cambridge, and Glasgow, and attended the Eighth Congress of the International Society for Cell Biology, where she presented two papers on work from her laboratory.

The undergraduate teaching program has continued without major change. The modification in the fourth-year clerkship permitting two months of continuous teaching either at the Presbyterian or one of the affiliated hospitals which was made last year, has worked out well. With the appointment of Professor Kenneth M. Lewis as director of the First Surgical Service at

Bellevue the teaching program for fourth-year clerks there was reorganized with the addition of several new staff members, and during the coming year a more effective use of this service for teaching will be inaugurated with the active collaboration of Professor Dickinson W. Richards, director of the First Medical Service. Minor rearrangements of the third-year program are also planned in an effort to incorporate more experience in anesthesiology.

The graduate program on the residency level has also been under intensive study. Revisions are planned to make better use of the training possibilities afforded by the combined Bellevue Chest—Presbyterian Thoracic surgical program, by the program in surgery of neoplastic disease at the Francis Delafield Hospital, and by the opportunities to work on a fellowship basis in the laboratories of surgical research. As opportunities for training in surgery expand it becomes evident that adequate experience in all areas cannot be included in a single program without lengthening the training period unduly, and that greater flexibility, with latitude for elective individual variation of program, is necessary.

Research activity has followed lines initiated, for the most part, in previous years. The animal surgery laboratory has been hard pressed to accommodate the demands made upon it, and additional staff is urgently needed to permit maximum use. A total of 640 operations on animals have been performed in relation to experimental projects in addition to the teaching exercises which occupy staff and facilities intensively each spring. Eleven projects originating within the department have been provided for, with a result that it has been increasingly difficult to accommodate requests from other departments. Provision was made for three of the latter.

Professor Ralph A. Deterling Jr., with the assistance of Drs. Shivaji B. Bhonslay and Sigmund Wesolowski has continued his studies on vessel grafts, studying especially homografts preserved by freezing and drying. In this connection an experimental human vessel bank has been established with the cooperation of the Department of Pathology and the financial support of the New York Heart Association. As an outgrowth of the work of Professor Arthur H. Blakemore and Dr. Arthur Voorhees, the efficacy of a variety of different plastic prostheses have been studied in animals. In addition, a study of the effects of hypothermia continues, and studies of extra-corporal circulatory support during open heart surgery have been initiated. Professor Ferdinand F. McAllister and Dr. Julius Jacobson continued their studies of gradual vascular occlusion. Professor Blakemore and Dr. Voorhees have devoted their major efforts this year to clinical evalaution of plastic prostheses for vascular replacement, but have also studied in the laboratory a newly developed braided prosthesis.

Professor Frantz has continued to collaborate in clinical and laboratory study of patients with thyroid disease, particularly cancer and thyroiditis, especially those cases suitable for treatment with radioactive iodine. Studies of

animals treated with this agent have been carried out with the aid of a research assistant, Dr. Mildred Phillips. In collaboration with Professor Harold D. Harvey, the third edition of *Introduction to Surgery* was published.

Professor John Scudder initiated a study of abnormal bleeding in patients subjected to operation. This study is being conducted by the blood bank in collaboration with the surgical laboratories under the direction of Professor David V. Habif, and with the assistance of Dr. George Kleinfeld, at present a surgical intern, and in consultation with Dr. Louise L. Phillips of the Department of Obstetrics and Gynecology. Professor Robert W. Coon of the Department of Pathology has also participated in this study. The selection of patients requiring fibrinogen and other hemostatic agents has been facilitated and a method worked out for the management of these cases at the time the abnormal bleeding tendency manifests itself.

Professor Harold G. Barker has continued his studies on the early post-operative physiological adjustments which the body must make with respect to the role of the kidney in the regulation of acid-base balance, the clinical significance and management of electrolyte and fluid shifts, and studies of special groups, in particular jaundiced patients and those having undergone shunt procedures for portal hypertension with ascites. A new project has been started on pleural fluid dynamics in patients who have pleural effusions from a variety of disease states. Evaluation of lymphatic function in the arm following radical mastectomy was undertaken by Professor Habif, Dr. Enzo H. Krahl, and Miss Audrey Armstrong.

Experimental work bearing directly and indirectly upon the cancer problem has continued in the laboratory for cancer chemotherapy research of the Department of Surgery under Dr. Daniel M. Shapiro, assisted by Dr. La Roy S. Dietrich. Methods of extending the program of study to human solid tumors are being investigated in anticipation of clinical application of the results obtained from the laboratory when this is deemed feasible and safe. The activities of this laboratory have been concerned with quantitative biochemical differences between tumor and host, a field in which there is an enormous amount of interest at the present time. Combining the clinical knowledge of tumor behavior with the experimental effects of agents influencing it seems to be the most logical approach to ultimate evaluation of results of cancer treatment by this method.

Professor Cushman D. Haagensen has continued his exhaustive study, with the assistance of Professors Michael Heidelberger and Dan H. Moore, of the nature of the agent causing mammary cancer in mice, especially its antigenic possibilities. Professor Godman has continued his studies of regenerating muscle in collaboration with Professor Margaret R. Murray, and of mucopolysaccharide production by mesenchymal cells in collaboration with Professor Charles A. Ragan of the Department of Medicine. Professor Edward L. Howes has continued his study of the nature, toxicity, and clinical usefulness

of bacterial enzymes, and of the presence and effects of autogenous enzymes in healing wounds, as well as the relationship between the healing process and the presence of mucoproteins locally and in the blood stream. Professor Robert S. Grinnell has continued his studies on large bowel anatomy and neoplasms in cooperation with the division of surgical pathology. Work is in progress with Dr. Nathan Lane on the occurrence and characteristics of adenomatous polyps of the colon and rectum for the purpose of trying to determine their relationship to cancer and a surer basis for surgical management. Professor Grinnell has also analyzed a group of squamous cell carcinomas of the anus, and published a paper recently on the distal intramural spread of carcinoma of the rectum and rectosigmoid.

The work in the laboratory for cell physiology, under the direction of Professor Margaret R. Murray, has continued at a higher level than ever despite her absence on sabbatical during several months. With eight research associates, assistants, and visiting fellows, space and equipment is once more at a premium, notwithstanding the expansion four years ago into new quarters. Its program, which is concerned with long-range problems at the cellular level approached by methods of tissue culture may be grouped under three headings: the factors governing the health, differentiation, and function of the normal cell; the extension of existing culture techniques for application to new research requirements; the application of tissue culture techniques to the diagnosis of human neoplasms, and the effects on human and animal tumor cells in tissue culture of agents which might be used clinically to destroy them.

The surgical bacteriology laboratory under the direction of Miss Balbina Johnson has been carrying on a clinical and laboratory research program for the purpose of determining the most effective preparation of the gastrointestinal tract for surgery by the use of antibiotics. The indications for and rationale of combinations of antibiotics in the treatment of surgical infections has been a continuing study of the laboratory.

The work of the electrogastrogram laboratory, under Dr. Edmund N. Goodman, has proceeded along two different lines, one clinical and one research: Dr. Henry Colcher of the Department of Medicine has joined the team and the investigative work is proceeding to study, first, the pharmacological effects, second, the emotional effects on the electrogastrogram. Dr. Melvin Schwartz, a biostatistician, has joined the laboratory in order to evaluate statistically the clinical results. On November 12, 1954, a symposium was held on the electrogastrogram which was well attended by physiologists, biophysicists and physicians from the United States and Canada. The department was also host to two other visiting groups, the Gallie Club and the Southern Society of Clinical Surgeons.

In addition to the activities abroad of the departmental members on sab-

batical leave, over ninety out-of-town meetings were attended by members of the department, over sixty papers were read, and over forty articles published. A twenty-five-year report of the department, prepared in connection with the twenty-fifth anniversary of the opening of the Columbia-Presbyterian Medical Center, was published in the summer of 1954.

At a meeting of the New York Academy of Medicine on January 6, 1955, Dr. Edward J. Donovan was inaugurated as president, Professor Emeritus Allen O. Whipple was presented with the Academy Medal, and the Anniversary discourse was given by Professor Frank Berry. Professor Emeritus Arthur Purdy Stout was elected chairman of the subcommittee on oncology of the National Research Council. Professor Rudolph N. Schullinger was named a charter trustee of Princeton University on October 22, 1954. On June 12, 1955, Professor Frank L. Meleney was awarded an honorary Doctor of Science degree by Dartmouth College.

DEPARTMENT OF UROLOGY

Professor George F. Cahill, Executive Officer

The teaching of urology to the senior class during the past year followed the same pattern as the previous year. A variety of cases covering the major types of urology were assigned for each student. Subjects for reading and reporting were again required of each student. In the time allocated to the department for teaching, every minute possible was used.

The only changes in the staff have been the retirement of the Professor George F. Cahill on June 30, 1955, and the appointment of Dr. John K. Lattimer, as professor of urology and executive officer of the department.

During the year Professor Harry Seneca has continued his work on antibiotics and the study of synergistic effects upon microorganisms. He has experimented in the mutation of endameba and has shown the difference between sensitive and resistant strains. He has used antibiotics to promote growth of microorganisms. He studied various gluco-corticoids and their effect upon infection and resistance. He studied the effects of anisomycin upon trypanosomas and leishmania and found it was not effective. He found that oxytetracycline and polymyxin stimulated spermatogenesis. He has been studying the effects of antibiotics upon ovarian function and the maturation of the Graafian follicle, and has been experimenting upon the mechanism of susceptibility to infection as influenced by cortisone and hydrocortisone. With Professor Abner Wolf of the Department of Pathology, he has isolated from monkeys arriving from India, an organism similar to *Trypanosoma cruzi.*

The group under Professor Perry B. Hudson studying genitourinary cancer conducts its activities in the area of enzymology, hormonal and steroid

chemistry, nucleic acid chemistry, surgical pathology, and clinical studies including surgical techniques. Drs. Thomas P. Price, Michael E. Lombardo, Kenneth K. Tsuboi, and Morris London have been associated with Profesor Hudson in this work.

The clinical study involving prostatic biopsy has continued and it is expected to provide evidence concerning the biological behavior of prostatic cancer. The study of mammary cancer patients subjected to total adrenalectomy has been continued in collaboration with Professor Alfred Gellhorn and Dr. Charles E. Crandall, Jr., of the Department of Medicine. Extraction and identification of steroids in the blood has been done in collaboration with the Worcester Foundation for Experimental Biology. The studies on the enzymology of human tissues, both benign and malignant, center upon prostatic acid phosphatase, the phosphomonoesterase of human erythrocytes, and the uricase of bovine origin.

Professor Hudson co-authored with Professor William Wallace Scott of Johns Hopkins University, a book entitled *Surgery of the Adrenal Glands.*

Professor John K. Lattimer continued his interest in renal and genital tuberculosis. During the year 1954–1955 he gave fifteen addresses to various societies upon urinary and genital tuberculosis and published seven articles.

Professor Meyer M. Melicow continued his investigations upon tumors of the testes. He also carried out extensive clinico-pathological studies upon bladder tumors and pathological studies of the adrenal glands.

Professor John N. Robinson was elected president of the Harvard Medical Society of New York, a member of the Executive Committee of the New York County Medical Society, and the Membership Committee of the New York Academy of Medicine. During the year he continued his work on the problems of maldescent of the testis and of male infertility.

Dr. Ralph J. Veenema reported upon his studies on prostatic cancer biopsy and also the evaluation of lumbar aortography.

During the year Dr. Ralph Yeaw was elected president of the New York Section of the American Urological Association.

Professor George W. Fish was elected to the editorial board of the *Journal of Urology* and was appointed a trustee of the American Urological Research Foundation. He made a tour of government hospitals as consultant in Lebanon, Turkey, Greece, and Iran, delivering several guest lectures at international meetings.

Professor Cahill during the year participated in medical meetings both in the United States and abroad, presenting papers upon various aspects of adrenal disorders. During the year he continued his interest with Professor Joseph W. Jailer and Dr. Marcel Goldenberg of the Department of Medicine in adrenal investigations.

MEDICAL LIBRARY

Professor Thomas P. Fleming, Medical Librarian

As the Medical Center's program is broadened by the inclusion of new fields of study, the demands made on the library are extended. All too frequently this occurs without the provision of additional funds for the strengthening of the literature collection and of added staff for the increased service load. The need for the literature in new fields of study may not be as evident as the need for professors, laboratories, and equipment, but it is just as real. These facts must be specifically recognized at a given point or new programs cannot be successfully undertaken. If it were recognized at the outset, it would be helpful to all concerned. By utilizing every means at our command, we have attempted to maintain the level of service, but each year unfortunately we slip a little further back. The professional staff of eight persons continued to play an active part in local, regional and national affairs, holding important committee posts, organizing and conducting symposia, and presenting papers at various professional meetings. Professor Fleming was granted a sabbatical leave during the winter session. He again conducted a five-day "Institute on Current Problems of Science Literature Service" during August.

Instruction in the use of the literature was again given to groups of students in the various schools and departments. This year an additional lecture on the literature of anesthesia was given by Erich Meyerhoff to a group of fifteen residents and interns in the Department of Anesthesiology.

Twenty-two students were enrolled in the six weeks' intensified course in medical librarianship. Three persons, two from Thailand and one from Ceylon, were present through the courtesy of the China Medical Board and one from India was sent by the Rockefeller Foundation.

Six new wooden cases were installed in the Current Periodical Reading Room making it possible to display nearly nine hundred more of approximately twenty-three hundred currently received periodicals. With each succeeding month, however, shelf space in the Periodical Reading Room becomes increasingly congested. The seriousness of this predicament has, therefore, resulted in the decision to deviate from the long-standing policy of displaying currently received titles in all languages. To alleviate this congestion, approximately 130 titles in languages other than English, French, German, and Italian are now being channeled directly to the balcony stacks instead of the Periodical Reading Room. Current issues within this group are appropriately filed with their bound predecessors as each new number is received.

In the balcony stacks on the fourth floor where we keep the back bound volumes of copy I of our journals, we have again, because of the lack of space, had to revise upward by five years the cut off dates, i.e., 1945 for English and 1950 for foreign language journals.

The lack of space continues to handicap us. In order to achieve a little room we added to our rare book deposit in the Butler Library that portion of our historical collection which was printed in the United States from 1801–1829 or printed elsewhere between 1701–1749. Several of the volumes were brought back for use the day after they were sent down.

It is a pleasure to report the continued support of the library by gifts and contributions from its many friends.

Two rather extensive collections were received during the year: The library of the late Dr. Louis Bauman, primarily biochemical in nature, and the library of Dr. Byron Stookey on neurology and neurosurgery.

WILLARD C. RAPPLEYE, M.D.

June 30, 1955 *Dean*

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